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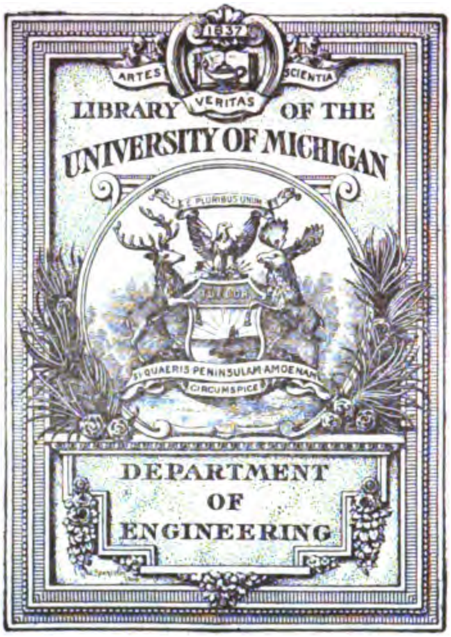

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SUPPLEMENT

TO THE

ANNUAL REPORT

OF THE

State Engineer and Surveyor

125887

OF THE

STATE OF NEW YORK

FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1902

TRANSMITTED TO THE LEGISLATURE JANUARY 22, 1903

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1903

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REPORT

ON THE

VOLUME OF DISCHARGE OF STREAMS

IN THE

STATE OF NEW YORK

1902

REPORT

ON THE

-OPERATIVE SURVEY

OF THE

OF NEW YORK

1902

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INTRODUCTION.

The following extracts from the Annual Report of the State Engineer and Surveyor of New York, for 1902, relate to those portions of the work of this Department which are done by co-operation between the United States Geological Survey and the New York State Engineer Department:

REPORT ON MEASUREMENT OF THE VOLUME OF STREAMS AND FLOW OF WATER IN THE STATE OF NEW YORK. (Reprinted from p. 38.)

There is an increasing desire to develop the many water-powers throughout the State, and a growing demand for increased water supplies for the great cities, with the result that the State Engineer receives many requests for the records of measurements of the volume of streams and of the flow of water. The approval which this new work of the State has received during the past two years has confirmed the wisdom of the Legislature of 1900, when it made the first appropriation for this work, and enacted the following quoted law:

"*The People of the State of New York, represented in Senate and Assembly, do enact as follows:*

"The Treasurer shall pay on the warrant of the Comptroller, for the State Engineer and Surveyor, one thousand dollars to be used with the United States Geological Survey in hydrographic work connected with the measurements of the volume of streams and flow of water in the State of New York."

This act became a law April 13, 1900, and the results have received a public approval so general that the subsequent Legislatures have slightly increased the amount to $1,500 per year, which sum has been equalled or exceeded each year by the United States Geological Survey, and the whole has been applied to the measurement of those streams of which the records were most needed, extending the field of operations whenever this could be done, within the limits of the very small amount available.

This law is similar in its provisions and in its effects to existing laws in other states, and it has enabled the State Engineer to arrange a system of co-operation with the United States Geological Survey, by which the State has the full benefit of the experienced and skilled observers of that Department, and of their accurate instruments and methods, and thus obtains, at a merely nominal cost, much desired information, which increases in value by its continuance from year to year.

New stations have been added wherever possible, and the records have been obtained from voluntary observers connected with manufactories on the various rivers, who appreciate the value of having their records studied and collated by skilled hydrographers, by whose work they are thus enabled to profit. Where paid observers are necessary, they usually read the gauges twice a day and record the readings and the thickness and extent of ice on streams in the vicinity and report them once a month to the central office; for which service they receive an average of $3.47 per month each.

A record of these gauge-readings makes it possible to determine the mean volume of water passing it day by day by means of current-meter measurements, which are occasionally made by a skilled observer who visits each station for a few hours at a time when the stream is at various heights, and thus determines the amount of water passing for different heights of the gauge-readings; the discharge of the stream being fairly constant for a given height on the gauge, and increasing in more or less regular ratio as the water-level rises. There is thus constructed for each stream a table showing the amount of water passing for any given height, and there is thus obtained a complete record of the flow of the stream. Gauges are so located that the metre-observations can be made from a bridge spanning the stream, whenever satisfactory conditions and regular flow are found, but such gauge locations are avoided if the flow is much disturbed by bridge-piers, which sometimes make accurate records impossible. In some cases (as on the Oswego river, eight miles from Lake Ontario, and on the Moose river) a fixed wire cable is stretched across the stream, well above water-level, and the observer makes meter-readings in a car in which he travels upon this cable.

It is intended to establish these meter-gauges upon streams where it is practicable, and to gradually discontinue observations at dams where the conditions are unsatisfactory.

With the records obtained during 1902 there have been collected certain heretofore unpublished former records of the same streams, and the results are here given in tables showing the daily mean flow and also hydrographs which give the same information graphically, and which show at a glance the periods of high-water and of low-water, and the regular or erratic character of the flow of the various streams, which differ widely with the varied nature of their watersheds.

Uniform hydrographs will be found representing the flow of streams which, like the Oswego river, have their headquarters in systems of lakes which affect the natural regulation of their flow, and which prevent extremes of either high water or low water. Irregular hydrographs show the flow of streams having, like the Mohawk river, sudden and extreme variations due to a quick run-off from the cultivated hillsides which form their watersheds.

The tables give the daily means of flow in more detailed form, and such photographs are here given as are necessary to show the varied conditions existing at the various streams.

There are in New York State a great many undeveloped water powers which are likely to be brought into use by the present possibilities of electrical development and long-distance transmission. Such a case is described in detail at page 153 as being an interesting illustration of what can be done in this way on a comparatively small scale, and by which a stream which has formerly gone to waste has recently been made to produce about 1,000 horse power of electrical energy, which the enterprising owner distributes to a number of towns in the vicinity.

The gratifying results which have been obtained by the co-operative system of stream measurements are largely due to the effective attention and efforts of Mr. F. H. Newell, chief hydrographer of the United States Geological Survey at Washington, and of Prof. Henry A. Pressey, who has general charge of this portion of their operations, and also to Mr. Robert E. Horton, who is in local charge in this State, and whose detailed report, with the photographs and tables which show the results, is appended.

The value of these records is such as to show that the system should be still further extended, and should be made to include many other important streams in different parts of the State regarding which inquiries have repeatedly been made, and the appropriation of $3,000 is recommended for this purpose, although a larger sum could be used to great advantage.

SURVEY OF THE STATE IN CO-OPERATION WITH THE UNITED STATES GEOLOGICAL SURVEY. (Reprint from page 30.)

This work of co-operation was begun in 1892 and has since been continued by annual appropriations by the State, for the payment of one-half of the cost of the field work of the survey, the last being for $20,000.

Close attention has been given and close examination made of the merits of this system of co-operation and of the character of the work which is done under it, and it is found that the State is getting a fine class of work at a comparatively low cost. The maps which are produced are of great value to the State in many ways; especially in connection with the work of highway improvement in different parts of the State, and with the work of the Forest Preserve Board in the portion covered by the maps, and in the examination of water supplies for existing and proposed canals and for the great cities. A proof of each sheet is sent to this office from Washington for examination and approval before being finally published, and in this way judgment is made as to the character of the work and in some cases valuable additions are thus made.

The maps are published on a scale of about one inch to the mile, in sheets of which about 244 will cover the whole State;

each sheet showing about twelve miles east to west by eighteen miles north to south. One hundred and twenty-four of these sheets have been completed and published and are for sale by the United States Geological Survey at the nominal price of five cents each or $2 per hundred; the engraving and publishing being done entirely at the expense of the United States Government. Thirty-eight sheets are mapped and in the hands of the engravers; ten are surveyed and are in the hands of the draughtsmen. Of the remaining eighty-two which are required to cover the entire State, fifty-five have been triangulated and are ready to be surveyed for the first topographical mapping.

The operations are detailed in this volume at pp. 343 to 364, and the statement of Hon. Charles D. Walcott, Director of the United States Geological Survey, is given at p. 341.

It is recommended to the Legislature that this co-operation of the State with the United States be continued, and that an appropriation of $30,000 be made therefor.

* * * * * * * * *

Respectfully submitted,

EDWARD A. BOND,

State Engineer and Surveyor of New York.

REPORT

ON

Gaugings of the Volume of Discharge of Streams

IN THE

STATE OF NEW YORK.

1902.

By ROBERT E. HORTON, Hydrographer.

Under direction of Hon. EDWARD A. BOND, State Engineer and
Surveyor; in co-operation with United States Geological Survey,
F. H. NEWELL, Chief of Division of Hydrography.

Report on Gaugings of New York Streams, 1902.

By Robert E. Horton, Hydrographer.

The present report contains such of the results as are now available, of work done in accordance with the appropriating clause in Chapter 594 of the Laws of 1902, in "determining the water supply available for canals, and for potable and domestic uses and for the development of water power." As illustrating the value of the water resources of New York to the State, the following statistics from the Twelfth United States Census are given. They show an aggregate installed power of water wheels of 330,543 horse power in 1900. In 1880 the water power in use in the State was determined by the census officials to be 219,348 horse power.

INDUSTRY.	Number of establishments in State of New York in 1900.	Horse power of water wheels in use in 1900.
Agricultural implements	19	1,101
Boots and shoes	7	590
Brick and tile	1	50
Carpets and rugs	5	1,660
Carriages and wagons	25	1,006
Chemicals	14	514
Cordage and twine	3	800
Cotton goods	16	8,494
Cotton small wares	1	36
Dyeing and finishing	5	560
Felt goods	4	862
Flour and grist mills	1,053	58,775
Hosiery and knit goods	71	7,164
Iron and steel	3	1,300
Leather tanned and curried	34	1,419
Linen goods	1	100
Lumber	278	24,003
Lumber and timber products	450	21,321
Paper	175	189,737
Printing and publishing	56	305
Ship building	4	1,541
Shoddy	5	299
Silk manufacturing	7	828
Wool hats	2	275
Woolen goods	46	4,493
Worsted goods	3	3,310
Total	....	330,543

In publishing the results of stream gauging operations of 1902, the method adopted consists in issuing a new edition of the report of 1901, which is entirely exhausted, and adding to each chapter the new data acquired during the year 1902; descriptive matter has been added chiefly in connection with the newly established stations. A few typographical and other errors have been corrected in the former text.

In connection with the gaugings of streams proposed as sources of supply for New York City, certain investigations bearing on the sanitary and economic value of the waters have been made, the results of which are included in the report. Some data is also given pertaining to the distribution of velocities in the stream cross-section. This has been obtained in connection with the regular gaugings of the streams as a basis for the reduction of the current-meter measurements.

The year 1902 has been particularly unfavorable for hydrographic investigations; it being practically impossible to secure certain classes of data excepting at times of low water. Some records are therefore withheld for completion. In order to complete rating-curves for current-meter gauging stations, the period during which discharge measurements are made, should include all the varying stages of the stream from the lowest to the highest. This requires that a year or more shall elapse from the establishment of the station before a rating-curve can be completed from which the daily gauge readings can be reduced to second-feet discharge. For stations where the rating-curves are not completed, the mean daily gauge readings and the results of the current-meter measurements are given. From these a good general idea of the yield and regimen of the stream can usually be derived, even though the final deductions for run-off are not available.

Information concerning the yield of streams during the winter months is less abundant than for the open seasons, partly, no doubt, because of the greater difficulty of securing reliable data when the streams are frozen over. Such information is of especial value for cases where water power is used for electric lighting purposes; the heaviest load and hardest service usually being during the winter. At current-meter gauging stations, where the stream becomes ice-covered, the rating-curve applicable in summer may be modified by the presence of ice. In order to secure needful data in this regard for the current-meter stations now in operation, a part of the allotment of funds for the year has been set apart for making measurements through ice. The present report is therefore only a partial record of the year's work.

Acknowledgment is made of the services of H. R. Beebe and C. C. Covert as Assistant Hydrographers, and P. M. Churchill and F. H. Tillinghast, Resident Hydrographers for the Catskill region, and of Wm. Nunn as computer.

METHODS EMPLOYED IN GAUGING NEW YORK STREAMS.

At the time the work was undertaken in April, 1900, gauging records were being kept at about twenty stations, most of which had been established in connection with the Upper Hudson Storage Survey of 1895 and 1896, or by the U. S. Board of Engineers on Deep Waterways,(a) 1897-1899.

These stations were all in connection with dams and mills. The method pursued in gauging the discharge of a stream at a dam may be briefly outlined as follows: Considering first the dam proper, the length and profile of the crest has in each case been determined during the season of low water, and the volume of flow, corresponding to a series of observed depths on the crest, has been computed by the weir formula.

In order to take into account modifications of discharge, due to variations in the width of crest of dams, slope and form of aprons, etc., values of the coefficient C have been selected in each case, as deduced from experiments made at the hydraulic laboratory of Cornell University, for the United States Board of Engineers on Deep Waterways, and also by John R. Freeman, C. E., have largely been drawn upon.

In many cases the profiles of the dams are slightly irregular. The dam is divided into sections which are computed separately, all points in a given section being nearly or precisely at the same elevation. For rough calculations of flood flows, etc., the average crest elevation is sometimes taken. This method gives slightly too small results throughout, inasmuch as the discharge over the lower part of the crest is greater in proportion to the head than that over the higher portions of the profile.

(a) See Reports of State Engineer and Surveyor of New York, 1895 and 1896, and Report of U. S. Board of Engineers on Deep Waterways, 1897-1899, pt. 11

Gauges have, as a rule, been placed several feet upstream from dams, where the cross-sectional areas of the mill ponds are so great as to make the velocity of approach negligible.

Having calculated the flow for a series of crest depths, extending from zero to the extreme high water mark, a discharge curve has been plotted, from which the volume of flow over the entire dam, corresponding to any gauge height, can be read directly. When flashboards are placed on dams, the conditions are reduced more nearly to those of a standard sharp-edged weir, and Francis' well-known formula has been used in computing the discharge. The flow over waste weirs, auxiliary spillways and flood overflows has been calculated in a manner similar to that used for dams. The amount of flow through head gates, sluiceways, feeder gates and similar openings has been calculated from the formula for orifices. Precise experiments to determine the value of the coefficient of discharge through large submerged orifices, as in bulkheads or canal feeder gates, are greatly needed.

In estimating the discharge through turbine water wheels the results of tests, made at the testing flume of the Holyoke Water Power Company, have been largely depended upon, the mean discharge for each day having been computed from the observed working head, width of opening of speed gates and number of hours each wheel has run. A record of these facts is kept at each of the stations where there are mills in connection with dams.

One difficulty encountered in gauging northern streams results from the accumulation of ice during the winter season. It has been found impossible to keep some dams clear of ice, and an effort is made to keep a record of the length of the clear and unobstructed portion of the dam from which a correction in the calculated flow can be made.(a)

(a) See Paper, Difficulties encountered in Gauging Streams over Dams, H. A. Pressey, 21st An. Report U. S. Geol. Survey. pt. 4, pp. 21-30.

Views of the cross-sections of many of the dams where gauging records are kept, as well as the results of the experiments made at Cornell University to determine the proper coefficients of discharge, may be found in a paper on Flow of Water Over Dams, by George W. Rafter, M. Am. Soc. C. E., contained in Trans. Am. Soc. C. E., Vol. XLIV, pages 220-398. See also Water Supply and Irrigation Paper, U. S. Geol. Survey, No. 35, page 2. In connection with all older stations at dams and mills, an effort has been made to check and improve upon the previous results by making current meter measurements to determine the volume of flow through turbine water wheels and the proper allowance to be made for leakage of dams, and to check the calculated flow over dams.

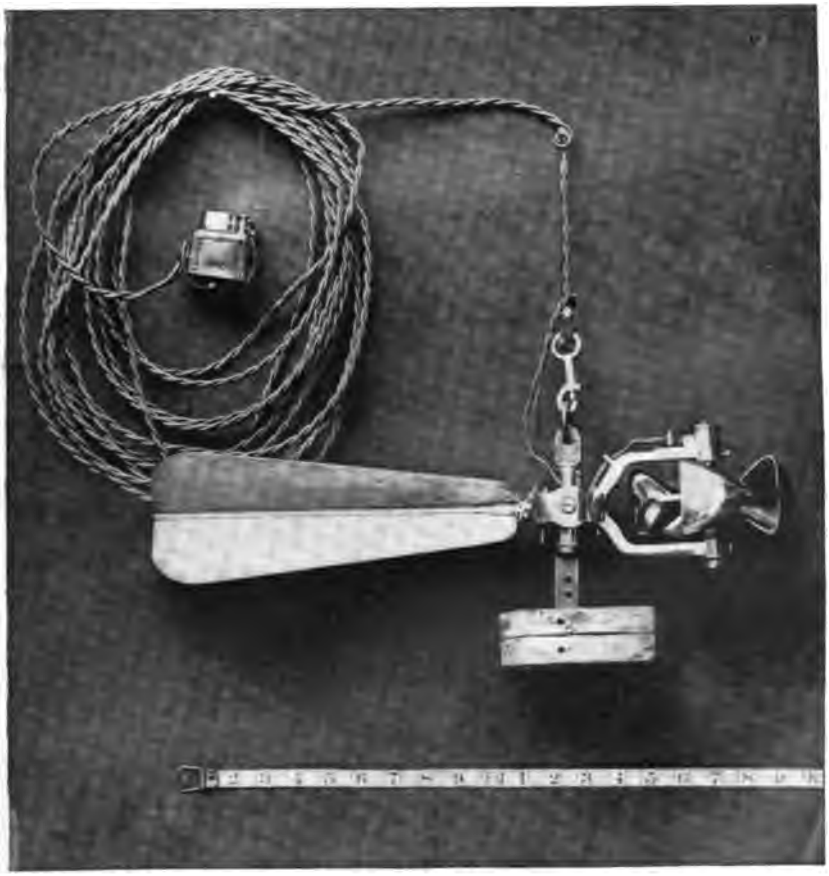
In the establishment of stations no single method of gauging has been adopted to the exclusion of all others. The report shows results obtained at dams and mills, by measurements over standard weirs, through thin partitions, by current meter, and by the slope formula. In many instances two or more methods have been combined at a single station. Owing to different methods and conditions, the degree of accuracy obtained is not uniform throughout the records. An effort has been made to describe each station with sufficient fullness to enable the reader to clearly understand the methods employed and probable accuracy of the results.

Recent developments in electric transmission have given an impetus to the construction of substantial masonry dams and power plants on many streams, affording almost ideal conditions for maintaining gauging records. Most of the stations at dams are in connection with such plants. Private individuals or corporations interested often co-operate, and excellent records are in this way obtained with comparatively slight expense. At the newer stations, where the current-meter method is employed, a modified form of Price meter, adopted by the U. S. Geological Survey, has been used. This instrument is made in two sizes, the larger for strong currents, the smaller for streams of moderate or low velocity of flow.

The usual mode of procedure is to submerge the current-meter 0.6 of the depth of the stream at measured intervals across the channel and record the revolutions for a period of 100 seconds. In cases of doubt, surface and bottom velocities are also taken, or the flow determined by the method of integration as a check. The mean velocity in vertical planes is also measured from time to time to check the accuracy of the "0.6" method, and also to determine whether any progressive change is taking place in the measuring section, due to sedimentation or scour. (See Appendix.)

The current meters used are calibrated each year at the rating station of the Geological Survey at Chevy Chase, Md. A rating table for the meter is then prepared, by means of which the velocity of flow of the stream can be deduced from the observed revolutions per second of the meter wheel. Soundings are taken in connection with the meter observations, and a simple multiplication of the velocity in each sub-section by the cross-sectional area to which it applies gives the rate of discharge for the sub-section. A summation of the quantities for the several sub-sections gives the total measured volume of flow. A river height gauge is established at each current-meter station from which the stage of the stream is observed once or twice daily. Current-meter measurements of the discharge are made from time to time as opportunity permits. After a sufficient number of discharge measurements have been made they are plotted, using the gauge heights of the stream as ordinates and the measured discharges as abscissas. A mean curve is drawn through the plotted points showing the discharge-rate in second-feet as a function of the gauge reading. By means of this curve the average discharge-rate for each day is deduced from the record of the height of the stream kept by the gauge reader.

The principal sources of error in gauging streams by the current-meter method are due to the effect of slack or nearly slack water in any part of the cross-section, or to backwater from dams, from obstructing ice, or from tributaries entering below the gauging station, thereby causing the river stage to rise at times without a proportional increase in the discharge. In accordance with the well-known Kutter formula, the volume of flow in an open channel is a function of the slope, area of



Price Current-meter: Modified large size, 1901.

cross-section and wetted perimeter. When a stream is rising, the slope is usually greater at a given stage of the stream than at the same stage when falling. Northern streams, as a rule, rise rapidly and fall gradually, so that the stream is falling on the majority of days of the year. The error from the above source is small, inasmuch as the discharge varies only as the square root of the slope. The principal difficulty encountered results from freezing over of streams in winter. The ice serves greatly to increase the wetted perimeter of the measuring section, thereby modifying the rating curve. Whenever practicable, discharge measurements during winter months are made through the ice. The accuracy of individual current-meter measurements depends chiefly upon the number of velocity observations taken in the cross-section.

Owing to rapid fall, with frequent rifts, backwater from dams, obstruction by ice, and other characteristics of New York streams, the difficulty of maintaining continuous gauging records which will show with sufficient accuracy the discharge rate day by day throughout the year is very great. This is especially true in streams whose discharge fluctuates between wide limits.

The discharge of the lower Mohawk at Rexford Flats and Schenectady, for example, varies from 500 to 55,000 second-feet or more. In such cases methods of gauging applicable at low and ordinary stages may not give equally reliable results during freshets; or the reverse may be true, the results being most accurate for high water.

In connection with the meter stations it is necessary to employ as gauge readers persons living near the site selected for the measuring section, and who have, as a rule, had no previous experience in similar work. Their observations are forwarded at the end of each week. As a check on the records so obtained, inspection trips are made at frequent intervals and independent gauge readings taken by the hydrographer. On receipt of the gauge reader's record for the corresponding period the two sets of observations are compared. The close agreement found in most cases testifies to the intelligent and careful work of the observers.

At the beginning of the work in 1900 many of the older stations were neglected and the painted gauge boards originally used were worn out. The stations have been equipped throughout with heavy hardwood or cypress gauges, having brass or galvanized metal figures and division marks. At a number of current-meter stations where there was no opportunity to secure vertical gauges in permanent position, weight and wire gauges are used. These are perhaps less accurate than direct reading vertical gauges; but convenience and freedom from ice obstruction are in their favor. A weight gauge may be attached to the guard-rail of a bridge. A more usual method is to secure it by outriggers to the horizontal bridge chords in such a manner as to be least disturbed by traffic and to permit the removal or renewal of the bridge floor planks without disturbing the gauge. When streams are ice-covered an opening is kept underneath the gauge and the reading taken directly to water surface as in summer. A record is also kept of the ice thickness in inches.

In this connection acknowledgment is made of the services of those who have assisted in the field work and in the preparation of this report. Special credit is due to J. D. Luther and M. T. Reilly.

FORMULAE.

The following hydraulic formulae have been employed in the calculation of gauging records. They are frequently referred to by name in the report, and are given here for reference:

The weir formula.

This name has been given to the general expression for flow over a weir or dam in its simplest form.

$$Q = C\,L\,H^{\frac{3}{2}} \quad (1)$$

This may also be written

$$Q = \tfrac{2}{3}\,K\,L\,H\sqrt{2\,g\,H} = M\,L\,H\sqrt{2\,g\,H} \quad (2)$$

$Q =$ volume of discharge in second-feet.

$$C = \tfrac{2}{3}\,K\sqrt{2g} = m\sqrt{2g} \quad (3)$$

$L =$ length of crest or clear overflow feet, corrected for end contractions if any.

H = head on crest corrected for velocity of approach if any.

C, K and M are constants, determined by experiments.

The Francis formula for a sharp-edged weir.(a)

$$Q = 3.33\ L\ H^{\frac{3}{2}} \quad (4)$$

If the weir has end contractions

$$L = L' - 0.1\, n\, H \quad (5)$$

L′ = actual length of crest, feet.

n = number of complete contractions.

If the approaching stream has an appreciable average velocity in the cross-section of the leading channel opposite the point where h is measured

$$H = \left[(h+d)^{\frac{3}{2}} - d^{\frac{3}{2}}\right]^{\frac{2}{3}} \quad (6)$$

h = actual measured head on weir, feet.

d = head due to mean velocity V, in the leading channel.

The Francis formula for Merrimac dam.(b)

$$Q = 3.01208\ L\ H^{1.53} \quad (7)$$

Mullin's formula.(c)

This is used by East Indian engineers in designing irrigation works.

$$Q = \tfrac{2}{3}\, c\, L\, H \sqrt{2gH} \quad (8)$$

For a sharp-edged weir:

$$c = 1 - \left(\frac{0.04\ (34.6 + H)}{4}\right) = 0.654 - 0.01\ H \quad (9)$$

For a broad-crested weir C′ is used.

$$C' = c - \left(\frac{0.025\ c\ (B+1)}{H+1}\right) \quad (10)$$

B = width of flat crest in feet

Bazin's formula.(d)

$$Q = M\, L\, h \sqrt{2gh} \quad (11)$$

(a) Lowell Hydraulic Experiments, J. B. Francis, pp. 112-120.

(b) Lowell Hydraulic Experiments, J. B. Francis, pp. 136-137.

(c) Mullin's Irrigation Manual, pp. 138-139.

(d) Annales des Ponts et Chaussees, October, 1888.

M is a coefficient experimentally determined by Bazin for thin-edged and various other forms of weirs. This formula differs from those given above in that the coefficient M includes the correction for velocity of approach, the measured head h being applied directly in the formula.

Formula for orifices.

$$Q = C A \sqrt{2gH} \quad (12)$$

C is a variable coefficient, its value depending on the degree of contraction in area of the issuing jet.

A = area of orifice, square feet.

This formula is applied to submerged orifices by making H the difference in elevation of the water surface on the upstream and downstream sides.

If the water approaches the orifice with an appreciable velocity, a correction is applied to the measured head in a manner similar to that used for weirs. In this connection the use of the term "second-feet" may be explained; this term has been adopted by the U. S. Geological Survey in place of the longer equivalent expression "cubic feet per second," in expressing the volume of water passing a given place in a stream per second.

DESCRIPTION OF TABLES OF DAILY DISCHARGE.

The object of the stream gaugings briefly stated, is to determine for each day the volume of flow or rate of discharge of the stream measured.

For mill streams, where the water is held back as pond storage during the dry season, it is impossible to determine the natural regimen of flow of the stream. This is especially true with reference to Sundays or holidays, when mills are not running. If, at the time the water wheels are stopped, the water stands below the level of the crest line of the dam, the flow in the stream channel below will be nil, or at best, will only equal the leakage of the dam, flumes, or penstocks.

With regard to estimation of Sunday flows, no uniform rule has been followed. In case of some of the older records, the

Sunday flow during the dry season has been taken as the mean of the calculated flows for the preceding and following days, and this method, where previously used, has been adhered to. In other instances the flow given in the table for each day is that shown by the gauging record, and represents, as nearly as may be, the actual amount of water flowing in the stream channel below the dam, but may be quite different from the amount entering the pond above the dam on that particular day. Ultimately of course all the water that enters the pond passes the gauging station and is included in the records.

The relation existing between the canals of New York and the streams of the central portion of the State is very implicit. Diversion from the headwaters of a number of streams for the supply of canals virtually reduces their effective drainage areas. As a result, the summer watershed may be materially less in area and differ widely in its water yielding characteristics from the region tributary to the stream when the canals are not in operation.

It often happens that a single gauge reading, taken at or near the culmination of a flood, shows a larger flow than the mean for any single day. The result of such isolated observations, together with other data relative to extremes of flow, have been given for a number of stations. Where two or more gauge readings are taken each day, the mean of the readings for 24-hour periods is used as an argument in entering rating tables to determine the mean daily flow. Theoretically, the several discharge rates should be separately determined for each gauge reading and the average taken. The method of averaging the gauge readings is much simpler, and it is believed that the error due to the fact that the discharge increases more rapidly than the stream stage both for dams and current meter sections, is well within the limit of error of the results in most cases. Where water fluctuates above and below the crests of dams, due to draught from pondage at mills, the discharge is usually computed for the period when water level is above crest and the equivalent rate of discharge if the flow were distributed through 24 hours, is used.

DRAINAGE TRIBUTARY TO LAKE ONTARIO.

This region includes the third river system in magnitude of the State; the Seneca, Oneida, Oswego Basin. The character of the run-off varies from the Genesee River in the west with relatively low rainfall, little forest, and great extremes of flow; to the Black River, draining a region of heavier precipitation, better ground storage and well maintained regimen at all seasons.

Most of the streams possess notable waterfalls where they pass from the areas of rock outcrop into the ancient Laurentian lake basin.

MOOSE RIVER BELOW McKEEVER, HERKIMER COUNTY, N. Y.

A gauging station was established on this stream at Moose River, 4 miles below McKeever railroad station, on June 5, 1900. The section of the channel chosen to be spanned by a cableway has a width of 225 feet, with a nearly flat gravel bottom. A vertical gauge board was attached to a pile driven some distance out in the stream beyond the low water margin, and protected from ice and logs by a floating boom anchored upstream.

This stream is characterized throughout its entire course by rifts and rapids. Topographically, the watershed is rocky, precipitous and mostly timbered. The drainage area above the gauging station is 346 square miles. An area of 41 square miles in the headwaters is subject to regulation by storage, controlled by a State dam at Old Forge, at the foot of the Fulton Chain of lakes.

There are numerous undeveloped water powers on the stream, including two falls near Lyonsdale, where a head of 30 feet or more might be obtained, and Miller's Falls, below Moose River, of nearly equal height.

Water power is developed at eight dams, utilizing a total fall of 225 feet, with an aggregate capacity of the turbines installed of over 7,000 horse power.

Lumbermen's dams, at the foot of several principal lakes, hold back a portion of the waters of the spring freshet to be used for log driving.

No current meter measurements have thus far been made. Gauge readings are taken twice daily, morning and evening, by Chris. Hannon, and the mean of the two readings for each day is shown in the accompanying tables.

Daily Gauge Heigth, in feet, of Moose River at Moose River, Herkimer County, N. Y.

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1...	......	......	......	......	......	......	0.50	0.85	0.90	0.70	1.15	.....
2...	......	......	......	......	......	......	.60	.70	.80	.75	1.20	.....
3...	......	......	......	......	......	......	.25	.70	.65	.80	1.05	.....
4...	......	......	......	......	......	......	.35	.60	.55	.70	.95	.....
5...	......	......	......	......	......	2.00	.30	.50	.60	.60	.85	.....
6...	......	......	......	......	......	1.55	.35	.55	.55	.60	1.10	.....
7...	......	......	......	......	......	1.25	.70	.60	.55	.60	1.10	.....
8...	......	......	......	......	......	1.20	.85	.55	.60	.65	2.25	.....
9...	......	......	......	......	......	1.95	.75	.55	.65	.60	3.10	.....
10...	......	......	......	......	......	1.55	.70	.60	.70	.60	2.50	.....
11...	......	......	......	......	......	1.40	.65	.70	.55	.65	1.75	.....
12...	......	......	......	......	......	1.20	.90	.65	.55	.55	1.15	.....
13...	......	......	......	......	......	1.08	.90	.80	.55	.45	.95	.....
14...	......	......	......	......	......	1.05	.80	1.80	.50	.45	.90	.....
15...	......	......	......	......	......	.82	.75	1.75	.40	.70	1.25	.....
16...	......	......	......	......	......	1.05	.70	1.25	.70	.85	1.75	.....
17...	......	......	......	......	......	0.92	0.80	1.20	0.70	0.75	2.05	.....
18...	......	......	......	......	......	.65	.75	1.00	.65	.60	2.30	.....
19...	......	......	......	......	......	.60	.85	.85	.60	.65	1.70	.....
20...	......	......	......	......	......	.80	.90	.60	.55	.75	3.95	.....
21...	......	......	......	......	......	.95	.80	.60	.80	.75	4.45	.....
22...	......	......	......	......	......	.90	.65	.60	1.20	.70	4.10	.....
23...	......	......	......	......	......	.80	.55	.50	1.55	.70	3.70	.....
24...	......	......	......	......	......	.70	.60	.45	1.30	1.30	3.35	.....
25...	......	......	......	......	......	.80	.85	.55	1.05	2.00	3.20	.....
26...	......	......	......	......	......	.60	3.05	.65	.90	1.65	3.05	.....
27...	......	......	......	......	......	.40	1.85	1.75	.90	1.30	3.65	.....
28...	......	......	......	......	......	.30	1.20	2.00	.85	1.30	3.75	.....
29...	......	......	......	......	......	.50	.90	1.35	.70	1.25	3.55	.....
30...	......	......	......	......	......	.55	.75	1.40	.80	1.25	3.20	.....
31...	......	......	......	......	......	......	.70	.95	......	1.30	......	.....
1901.												
1...	......	......	......	......	3.25	3.3	1.75	2.45	1.55	1.85	1.2	1.35
2...	......	......	......	......	3.25	3.3	1.4	1.9	2.45	1.7	1.1	1.2
3...	......	......	......	......	3.1	3.9	1.85	1.6	2.45	1.85	1.1	1.3
4...	......	......	......	......	2.8	4.4	1.7	1.35	2.35	2.15	1.2	1.45
5...	......	......	......	......	2.55	3.95	1.4	1.25	2.05	2.05	1.1	1.4
6...	......	......	......	......	2.6	3.4	1.15	.95	1.85	2.0	1.05	1.25
7...	......	......	......	......	2.4	4.4	1.45	1.80	1.65	2.0	.95	1.2
8...	......	......	......	......	2.9	5.15	1.5	1.75	1.45	1.9	.8	1.1
9...	......	......	......	......	2.7	4.1	1.35	1.75	1.4	1.85	.85	1.1
10...	......	......	......	......	2.85	3.7	1.25	2.0	1.35	1.85	.95	1.85
11...	......	......	......	3.3	2.8	3.4	1.1	2.2	1.55	1.9	.85	3.45
12...	......	......	......	3.35	3.85	3.15	1.1	2.15	1.6	1.95	1.1	.....
13...	......	......	......	3.5	4.45	2.7	1.15	1.95	1.75	1.95	1.85	.....
14...	......	......	......	3.75	3.75	2.6	1.1	1.75	1.85	2.25	2.85	.....
15...	......	......	......	4.55	3.45	1.95	.95	1.55	1.85	2.05	2.3	.....
16...	......	......	......	4.55	3.15	1.7	.85	1.45	1.9	2.7	2.15	.....
17...	......	......	......	5.2	3.0	1.6	.95	1.6	2.1	2.45	1.95	.....
18...	......	......	......	5.55	3.2	1.35	1.6	1.55	2.05	2.4	1.9	.....
19...	......	......	......	5.65	4.45	1.4	1.95	1.65	1.8	2.35	1.7	.....
20...	......	......	......	5.35	3.65	1.35	1.65	1.6	1.65	2.35	1.9	4.8
21...	......	......	......	5.85	3.3	5.85	1.25	1.55	1.5	2.5	1.55	4.4
22...	......	......	......	7.1	2.9	5.25	1.1	1.55	1.4	2.35	1.4	3.85
23...	......	......	......	6.75	2.9	4.7	1.15	1.45	1.35	2.25	1.3	3.45
24...	......	......	......	5.1	2.9	4.5	1.05	1.6	1.4	2.2	1.45	3.35
25...	......	......	......	4.65	3.05	3.85	.95	1.65	1.3	2.2	1.35	3.15
26...	......	......	......	4.4	3.25	3.3	1.1	1.55	1.25	2.15	1.15	2.95
27...	......	......	......	4.0	2.85	2.85	.95	1.45	1.25	1.95	1.35	2.75
28...	......	......	......	3.5	2.85	2.5	1.05	1.25	1.25	1.75	1.4	2.55
29...	......	......	......	3.4	3.25	2.25	2.5	.95	1.5	1.75	1.55	2.35
30...	......	......	......	3.55	3.55	1.95	3.35	.65	1.9	1.35	1.4	2.15
31...	......	......	......	......	3.55	......	3.35	.85	......	1.2	......	1.95

Mean Daily Gauge Height of Moose River at Moose River, Herkimer County, N. Y.—(Concluded).

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1902.												
1...	1.75	1.15	2.85	4.60	4.90	2.80	1.85	1.05	0.60	1.05	2.25	.....
2...	2.15	1.10	3.85	4.20	3.65	2.65	2.05	1.35	0.90	0.85	2.35	.....
3...	2.20	1.20	5.05	3.95	3.60	2.40	2.75	1.60	0.65	0.95	2.15	.....
4...	2.10	1.30	5.25	3.65	3.65	2.70	4.50	1.55	0.70	1.05	1.95	.....
5...	2.25	1.40	4.80	3.45	3.55	2.90	3.55	1.40	0.85	1.20	1.75	.....
6...	2.45	1.40	4.20	3.30	3.05	2.45	2.90	1.75	0.80	1.30	1.75	.....
7...	2.25	1.50	3.75	3.25	2.80	2.25	2.50	3.10	0.80	1.45	1.75	.....
8...	2.15	1.40	3.55	3.20	2.45	2.15	2.25	2.85	0.55	1.55	1.55	.....
9...	2.15	1.40	3.15	3.10	2.20	2.70	2.05	3.50	0.65	1.45	1.55	.....
10...	1.95	1.40	2.85	4.60	2.05	2.55	1.85	2.70	0.80	1.30	1.45	.....
11...	1.60	1.40	2.65	4.45	1.95	2.45	1.65	2.25	0.85	1.25	1.25	.....
12...	1.25	1.30	2.65	4.20	1.70	2.25	1.55	2.70	1.10	1.20	1.60	.....
13...	2.25	1.35	3.40	3.60	1.55	2.10	1.45	2.10	1.40	1.10	2.25	.....
14...	2.45	1.45	4.65	3.85	1.65	2.05	1.55	1.80	1.30	1.45	2.90	.....
15...	2.40	1.45	3.45	3.25	1.45	2.25	1.80	1.45	1.35	1.55	2.70	.....
16...	2.25	1.45	4.50	4.00	1.25	2.45	1.75	1.25	1.25	1.35	2.35	.....
17...	2.05	1.45	*6.00	4.40	1.20	2.25	1.45	1.15	1.15	1.15	1.95	.....
18...	2.25	1.45	......	3.40	1.10	2.05	1.35	1.05	1.25	1.15	1.95	.....
19...	2.05	1.60	......	2.85	1.05	1.85	1.65	1.05	1.25	1.25	1.75	.....
20...	1.85	1.75	......	2.50	1.10	2.15	2.95	1.10	1.10	1.25	1.75	.....
21...	1.75	1.90	4.50	2.85	1.00	2.25	2.25	1.05	1.15	1.45	......	.....
22...	1.70	1.90	4.15	2.50	0.85	2.85	2.05	1.10	1.20	1.55	......	.....
23...	1.70	2.00	3.80	3.05	1.10	2.40	1.85	1.15	1.10	1.35	......	.....
24...	1.80	2.10	3.75	2.75	1.80	1.95	1.55	1.10	1.05	1.25	......	.....
25...	1.65	2.10	3.60	2.50	2.65	1.85	1.45	1.95	1.20	1.45	......	.....
26...	1.55	2.05	3.40	3.10	3.30	1.95	1.80	0.85	1.25	1.65	......	.....
27...	1.35	2.05	3.15	4.80	3.90	2.40	1.40	0.80	1.20	1.75	......	.....
28...	1.40	2.25	3.10	4.25	3.45	2.10	1.05	0.75	1.30	1.95	......	.....
29...	1.30	......	4.05	3.75	3.25	1.85	0.95	0.65	1.20	3.35	......	.....
30...	1.30	......	6.40	4.75	3.35	1.55	1.00	0.65	1.25	3.95	......	.....
31...	1.20	......	5.20	......	3.50	......	1.10	0.65	......	3.20	......	.....

*Ice breaking up, water above guage.

Principal Developed Water Powers on Moose River.

No. of dam.	Mills at dam.	LOCATION.	Effective head. Feet.	H. P. of water wheels.	Number of employees.	Manufacture.
1	1	Near Lyons Falls.....	18	560	50	Wood pulp.
2	1	Near Lyons Falls....	30	1,208	31	Wood pulp.
3	1	Near Lyons Falls....	35	1,736	28	Wood pulp.
4	1	Lyonsdale.........	30	850	35	Wood pulp.
5	1	Lyonsdale..........	30	400	2	Paper.
6	1	Lyonsdale..........	35	1,252	40	Pulp and paper.
7	1	Above Lyonsdale....	30	1,000	40	Manila paper.

BEAVER RIVER AT TISSE'S BRIDGE, LEWIS COUNTY, N. Y.

Beaver River rises in western Hamilton county, crosses Herkimer county and emerges from the Adirondacks at Number Four on the Lewis county line. The flow from the tributary watershed above Beaver, comprising an area of 153 square miles or 47.5 per cent. of the entire drainage area, is regulated by storage in the Beaver flow or "Stillwater," an artificial lake formed by a timber dam 16 feet high.

In addition to the reservoir formed by the State dam at Beaver, there are in this region over fifty natural lakes, including Red Horse Chain, so that a comparatively uniform flow of the stream is maintained throughout the summer season.

From the State dam at Beaver to Number Four, a distance of 10 miles, the stream consists of numerous boulder rapids alternating with short stretches of smooth water. Above Beaver Lake occurs a fall, forming a descent of 60 feet within 400 or 500 feet. From the foot of Beaver Lake to Belfort, a distance of 12 miles, the stream channel continues rocky and precipitous, although the adjacent watershed is sandy and for the most part covered with timber. Eagle Falls, 2 miles below Beaver Lake, consists of a series of cascades aggregating a descent of 75 feet. There are a number of other undeveloped water powers in this vicinity. Water power is developed at Beaver Falls, Croghan and Belfort, aggregating 4,400 horse power at five dams, and utilizing a fall of 133 feet. There is also an abandoned power at Tisse's Falls, where a head of 16 feet could be obtained. Power is developed at Belfort under a head of 50 feet, for the generation of electricity, which is transmitted to adjacent towns, a distance of 16 miles.

An examination of Beaver River, in relation to facilities for gauging, was made in July, 1900. The almost continuous rapids in the upper reaches of the stream, coupled with the fact that all stretches of smooth water are filled with logs much of the time, make the selection of a site for a permanent gauging station very difficult. Tisse's bridge, crossing the river between the village of Croghan and Belfort, was finally chosen, and a gauging record started May 10, 1901. The bridge crosses the stream at the head of Tisse's Falls at a point where the gaugings will be unobstructed by either logs or ice. The bridge consists of two spans of 70.5 and 51.5 feet width respectively, crossing two arms of the stream on opposite sides of a wooded rocky island, one-half acre in extent.

A 12-foot cypress gauge, divided to feet and tenths, was secured to the down stream face of the right-hand abutment of the right span. The bench mark is a chiseled "O" in the bridge-seat above the gauge board.

Elevation of bench mark.................... 100.00
Elevation gauge zero........................ 88.70

One observation of the river stage is taken each day by the gauge reader, Nicholas Tisse.

Owing to the existence of cross-currents under the bridge, current meter observations of the velocity have been taken in every square foot of the cross section of the stream and the direction of flow of the corresponding filaments, as well as their velocity is taken into consideration in calculating the discharge. The results of current meter measurements are shown below:

Daily Gauge Height of Beaver River at Tisse's Bridge, Croghan, Lewis County, N. Y.

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1...	......	......	......	......	......	3.1	2.1	2.1	3.6	2.5	2.6	2.5
2...	......	......	......	......	......	3.1	2.1	2.0	1.6	2.7	2.7	2.6
3...	......	......	......	......	......	3.3	2.0	1.8	1.7	3.0	2.5	2.7
4...	......	......	......	......	......	3.5	2.0	1.2	1.7	3.1	2.5	2.6
5...	......	......	......	......	......	3.6	2.1	2.0	2.7	2.8	2.5	2.7
6...	......	......	......	......	......	3.5	2.1	2.0	2.2	2.9	2.4	2.8
7...	......	......	......	......	......	3.6	2.1	2.1	2.2	2.8	2.5	2.7
8...	......	......	......	......	......	3.5	2.1	2.1	2.0	2.7	2.4	2.6
9...	......	......	......	......	......	3.7	2.0	2.2	2.2	2.8	2.4	2.9
10...	......	......	......	......	......	3.6	2.1	2.3	1.9	2.6	2.2	2.8
11...	......	......	......	......	......	3.5	2.0	2.3	2.0	2.7	3.2	2.9
12...	......	......	......	......	......	3.1	2.0	2.7	1.9	2.5	3.0	3.4
13...	......	......	......	......	......	2.9	2.0	2.2	2.1	2.8	2.4	3.5
14...	......	......	......	......	......	2.9	1.9	2.1	2.0	2.9	2.2	3.3
15...	......	......	......	......	......	2.7	1.9	2.7	2.6	3.0	3.0	6.5
16...	......	......	......	......	......	2.4	1.9	2.3	2.6	3.0	3.1	5.4
17...	......	......	......	......	2.9	2.2	1.8	2.2	2.8	3.0	2.8	4.3
18...	......	......	......	......	2.4	2.2	1.9	1.3	2.7	2.9	2.9	4.0
19...	......	......	......	......	2.4	2.3	1.9	1.3	2.6	3.0	2.7	4.2
20...	......	......	......	......	2.1	2.7	1.8	1.3	2.5	2.9	2.8	3.9
21...	......	......	......	......	2.2	2.9	1.6	1.5	2.3	2.9	2.6	3.8
22...	......	......	......	......	2.5	2.9	1.6	1.5	2.2	2.8	2.6	3.8
23...	......	......	......	......	2.0	2.3	1.4	2.0	2.3	2.3	2.4	3.7
24...	......	......	......	......	2.4	2.9	2.3	2.5	2.4	3.0	2.5	3.4
25...	......	......	......	......	2.0	2.6	2.3	2.3	2.2	2.3	2.7	3.3
26...	......	......	......	......	2.7	2.6	1.2	2.2	2.3	2.3	2.8	3.4
27...	......	......	......	......	2.1	2.4	2.2	1.4	2.3	2.8	2.7	3.6
28...	......	......	......	......	2.9	2.5	2.0	1.6	1.1	2.8	2.8	3.4
29...	......	......	......	......	2.9	2.9	2.9	1.8	1.2	2.8	2.8	2.9
30...	......	......	......	......	3.0	2.3	2.7	1.9	2.0	3.0	2.7	2.9
31...	......	......	......	......	2.8	......	2.7	2.0	......	2.6	......	2.9
1902.												
1...	3.0	2.5	3.4	4.5	4.5	3.4	3.0	2.5	2.2	2.0	2.7	2.4
2...	2.9	2.4	4.5	4.4	2.0	3.2	2.7	2.5	2.0	2.1	2.5	2.3
3...	2.8	2.4	4.4	3.7	4.0	3.0	2.4	3.4	2.6	2.2	2.3	2.6
4...	2.8	2.4	3.9	3.5	4.0	3.2	2.4	3.0	2.4	2.2	2.0	2.7
5...	2.9	2.4	3.7	3.4	4.5	3.0	2.5	2.4	2.0	2.0	2.0	2.7
6...	2.7	2.4	3.5	2.0	4.2	3.4	2.5	2.4	2.0	2.2	1.9	2.7
7...	2.7	2.4	3.4	1.4	4.4	3.6	2.4	2.2	2.0	2.1	1.9	2.6
8...	2.7	2.4	2.4	3.5	5.0	3.6	2.5	2.3	2.0	2.2	2.0	2.6
9...	2.6	2.3	2.5	4.2	4.4	3.2	2.4	2.4	2.1	2.2	2.2	2.9
10...	2.6	2.4	2.5	4.1	4.0	3.9	2.5	3.0	2.0	2.1	2.4	2.9
11...	2.5	2.3	2.7	4.2	3.6	3.6	2.5	2.7	2.2	2.1	3.0	3.0
12...	2.5	2.3	3.3	4.4	2.9	3.2	2.5	2.4	2.3	2.2	3.2	3.2
13...	2.5	2.3	4.4	4.3	4.2	2.5	2.4	2.0	2.2	2.0	3.2	3.4
14...	2.5	2.2	4.9	3.4	2.4	2.2	2.5	2.0	2.2	2.0	2.9	3.5
15...	2.5	2.4	4.8	3.0	2.2	2.4	2.6	2.0	2.0	1.2	2.7	3.5
16...	2.5	2.4	4.9	3.0	4.4	3.2	3.0	2.1	1.8	1.2	2.7	3.4
17...	2.5	2.4	5.0	3.2	5.0	3.7	3.2	3.2	1.8	2.2	2.4	3.4
18...	2.5	2.6	5.4	2.9	4.6	2.8	3.2	3.4	2.0	2.2	2.6	3.3
19...	3.2	2.7	5.2	4.2	4.2	3.3	3.0	3.1	1.9	2.3	2.7	3.2
20...	3.1	2.8	4.8	4.3	2.6	3.8	3.0	2.7	1.9	2.2	2.7	3.0
21...	3.1	2.8	4.4	2.3	4.2	3.8	3.0	2.4	1.8	2.3	2.5	3.0
22...	2.9	2.9	4.0	2.6	4.4	3.5	2.9	3.3	1.8	2.4	2.2	2.9
23...	2.7	2.9	4.4	3.4	4.2	3.8	2.8	3.2	1.9	2.4	2.4	2.9
24...	2.6	2.9	4.4	4.2	4.2	2.6	2.8	3.0	1.8	2.2	2.4	3.1
25...	2.5	2.7	4.0	3.5	5.2	2.8	2.9	3.0	2.0	2.3	2.4	3.0
26...	2.5	2.8	3.9	3.2	5.4	2.4	2.8	2.5	1.8	3.2	2.4	2.9
27...	2.5	2.9	4.0	4.3	5.6	2.2	2.5	2.2	1.8	3.0	2.3	2.8
28...	3.3	3.7	3.7	3.0	4.2	2.4	2.5	2.2	2.0	3.0	2.3	2.7
29...	3.1	......	4.0	4.6	3.4	2.4	2.4	2.2	2.0	2.9	2.3	2.7
30...	2.7	......	4.5	3.7	3.5	2.3	2.6	2.2	2.1	2.8	2.4	2.5
31...	2.2	......	4.4	......	3.4	......	2.4	2.1	......	2.7	......	2.6

Current Meter Measurements.

DATE.	Gauge height, feet.	Discharge, second-feet.
July 4, 1901	2.02	283
May 29, 1901	2.98	538
June 10, 1901	3.50	997

One discharge measurement has been made during 1902, on August 26 by C. C. Covert Gauge height, 2.32. Discharge, 554 second-feet.

The drainage area of Beaver River above Castorland, where it empties into Black River, is 322 square miles. The drainage area above the gauging station at Tisse's Bridge is approximately 242 square miles.

Rainfall and other meteorological records have been kept since January, 1889, at Number Four, in the heart of the timber-covered portion of the watershed.

BLACK RIVER AT HUNTINGTONVILLE, JEFFERSON COUNTY, N. Y.

This river rises in Herkimer county and flows in a northeasterly direction into Black River Bay, an arm of Lake Ontario. A portion of its course is shown on the Watertown atlas sheet of the United States Geological Survey. Observations of the height of water have been made at the dam of the city waterworks of Watertown, located two miles above at Huntingtonville. The station was established on February 22, 1897, and the record has been furnished by Frank A. Hinds, M. Am. Soc. C. E.(a)

The conditions at this point are peculiar, in that the stream flows in two channels, with an island between. A high timber dam on the right branch creates a settling basin for the water supply of the city of Watertown. The other dam, on the opposite side of the island, is also of timber, and gauge readings are taken at a point about 500 feet above this dam. The crest of the dam is slightly irregular in profile, and for ease of computation has been divided into six parts, each of these being considered as horizontal. There is an elbow in the plan of the dam with its apex downstream, the juncture of the two wings being strengthened by a timber buttress, having a flat crest or platform.

(a) See Water Supply and Irrigation Paper, U. S. G. S., No. 36, p. 131.

The discharge over the dam proper has been computed, using coefficients derived from experiments on a dam having a similar cross-section, with a slope 2.1 on the upstream face, while the discharge over the flat platform has been computed from an experiment on a somewhat similar broad-crested weir.

The entire flow of Black River at this point, aside from leakage and a slight diversion for municipal water supply of Watertown, passes over the Huntingtonville dam. Two or more readings of the crest gaugé are taken daily, and the mean of all readings from midnight to midnight has been used in estimating the mean daily flow. In computing the flow over the dam, an allowance of 200 second-feet has been made for leakage through seams and crevices in the limestone rock underlying the dam. This amount has been arrived at from an estimate of the size of the orifices and the head of the same, when the water was drawn down in the summer of 1897.

There is no opportunity for directly checking the flow, during high water, immediately below the dam. A current meter measurement was made at Glen Park bridge on June 6, 1900, which gave a total flow of 2,175 second-feet. The mean daily flow is given in the following table. It does not represent the full water yielding capacity of the tributary drainage area, inasmuch as a portion of the flow from the headwaters is diverted to the Forestport Feeder to supply Black River canal. Storage reservoirs, to compensate water power users, are maintained by the State of New York on Beaver and Moose Rivers, the principal tributaries of Black River. These are described in connection with gauging stations on the streams named.

Reservoirs and lakes on the headwaters of Black River and Woodhull Creek are also utilized for storage for the supply of Boonville Feeder of Black River canal, affording a total water surface area of 6 square miles, receiving drainage from 267 square miles of watershed and having a total storage capacity of 1,220,155,000 cubic feet.(a)

Measurements of the amount of diversion from Black River below Forestport reservoir, made in connection with the Barge Canal Survey are described under "Mohawk River Gaugings" in this volume.

(a) See Report of New York Barge Canal Survey, 1901, pp. 666-672.

Above Lyons Falls the watershed of Black River is mountainous and largely timbered. At Lyons Falls, Black River is joined by Moose River, and the two flow over a declivity in limestone rock of 67 feet. From the foot of Lyons Falls to Carthage, a distance of 29 miles, the stream flows through a broad drift-filled valley, the current is sluggish, and the river is utilized for slackwater navigation. From Carthage to the mouth of the stream, a distance of 25 miles, the stream channel is mostly underlaid by limestone rock, affording numerous ledges utilized as sites for dams, making the stream of great importance as a source of water power. There are 22 dams in this section, furnishing roundly 60,000 horse power to 80 mills along the banks, which employ an aggregate of 3,900 persons.([a])

On the morning of April 21, 1900, the calculated discharge over the Huntingtonville dam was 30,150 second-feet, equivalent to a flow of 16 second-feet per square mile of tributary watershed. December 15, 1901, heavy rainfalls on frozen ground produced a freshet, yielding a calculated discharge of over 37,000 second-feet at the Huntingtonville dam or 19.2 second-feet per square mile. A portion of the embankment of the right-hand wing of the dam was washed out by this freshet. The gauge readings have been continued during 1902, but the discharge has not been computed. An independent record having been obtained at Felt's Mills, as described on page 38 of this report.

(a) Black River Water Power is fully described in Report of U. S. Board of Engineers on Deep Waterways, Vol. 2, pp. 841-868.

Mean Daily flow in Second-feet of Black River at Huntingtonville Dam, Jefferson County. N. Y.

[Drainage area, 1,889 square miles.]

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1897.												
1 ...	......	......	1,220	5,050	8,550	3,362	978	*1,710	......	......	598	6,812
2 ...	......	......	......	5,170	*7,692	2,865	956	1,606	......	......	872	5,850
3 ...	......	......	......	5,850	6,514	2,300	1,066	1,580	......	......	1,738	2,835
4 ...	......	......	......	*6,176	5,890	2,835	*890	1,292	......	......	2,610	2,450
5 ...	......	......	2,060	8,020	6,602	3,328	782	990	......	......	2,362	*3,425
6 ...	......	......	2,865	8,650	6,218	*3,095	646	782	......	......	1,850	4,665
7 ...	......	......	*3,230	9,590	5,970	2,579	1,066	630	......	......	*1,850	5,290
8 ...	......	......	3,396	10,916	4,739	2,300	710	*362	......	......	2,120	5,490
9 ...	......	......	3,600	11,540	*3,705	2,000	678	536	......	......	2,150	5,770
10 ...	......	......	4,230	11,540	2,900	4,484	746	630	......	......	2,800	5,850
11 ...	......	......	5,650	*10,500	2,900	6,176	*536	2,930	......	......	4,374	7,428
12 ...	......	......	5,970	8,750	2,455	6,428	582	6,812	......	......	4,411	*7,692
13 ...	......	......	6,602	7,340	2,515	*5,970	836	7,252	......	......	4,850	7,120
14 ...	......	......	*6,260	6,856	3,029	4,411	614	5,850	......	1,014	*4,020	6,680
15 ...	......	......	5,650	7,120	4,592	3,362	1,110	*3,420	......	1,220	3,670	7,252
16 ...	......	......	5,130	7,924	*5,170	2,770	1,198	2,362	......	2,455	3,029	8,068
17 ...	......	......	4,300	8,850	4,665	2,424	1,110	1,710	......	*854	4,125	8,500
18 ...	......	......	3,950	*9,240	4,125	2,030	*1,000	2,000	......	1,176	5,170	8,308
19 ...	......	......	3,880	9,690	3,328	1,658	934	2,424	......	1,110	5,210	*6,092
20 ...	......	......	2,240	9,390	3,062	*1,460	978	1,804	......	956	3,950	3,420
21 ...	......	......	*8,600	9,690	2,485	2,090	1,000	1,292	......	854	*2,930	3,195
22 ...	......	1,460	8,550	9,290	2,642	2,706	890	*†1,022	......	800	3,362	3,195
23 ...	......	1,460	10,916	8,260	*3,095	2,270	728	978	......	782	2,835	3,130
24 ...	......	2,610	16,500	7,648	2,424	1,804	630	694	......	*480	2,150	2,770
25 ...	......	1,850	4,250	*9,144	2,515	1,388	*480	522	......	956	1,850	2,393
26 ...	......	3,420	12,080	11,176	3,950	1,198	1,000	566	......	746	3,396	*2,515
27 ...	......	......	10,760	12,640	4,776	*978	934	582	......	782	6,218	2,270
28 ...	......	......	*7,924	14,142	4,374	1,198	890	322	......	854	*9,144	2,180
29 ...	......	......	6,176	13,806	4,020	978	1,220	*1,254	......	710	9,890	2,060
30 ...	......	......	5,450	10,552	*3,775	934	1,940	......	......	710	8,116	2,000
31 ...	......	......	5,450	......	3,600	......	2,000	......	......	*678	......	1,804
Mean.	......	2,160	6,317	9,484	4,267	2,713	940	2,280	......	954	4,155	4,725
1898.												
1 ...	1,738	2,770	2,300	7,340	*4,411	2,770	1,436	1,110	1,244	1,556	3,095	2,548
2 ...	*2,270	2,930	2,610	6,646	3,362	2,362	1,316	1,580	1,220	*1,022	2,706	2,455
3 ...	1,940	2,835	2,300	*5,050	3,530	2,030	*872	1,132	1,110	1,088	2,610	2,455
4 ...	2,000	2,610	2,300	3,950	3,705	1,804	800	1,292	*330	1,110	2,393	*2,240
5 ...	2,120	2,770	2,150	3,600	3,915	*1,738	1,110	1,460	1,340	1,412	2,300	2,300
6 ...	2,000	*2,455	*2,150	3,600	4,776	1,556	1,088	1,880	1,766	2,770	*2,210	2,240
7 ...	1,850	2,610	2,150	3,420	4,411	1,532	1,176	*1,710	1,684	3,420	3,095	1,940
8 ...	1,580	2,610	2,210	3,362	*3,420	1,340	1,022	1,580	2,060	2,865	2,930	1,804
9 ...	*1,850	2,455	2,674	3,095	2,770	1,176	956	1,244	1,940	*1,910	2,930	1,658
10 ...	1,804	2,300	3,420	*3,029	2,930	1,244	*728	1,110	1,804	1,940	2,930	1,684
11 ...	1,804	3,195	6,386	3,029	2,455	1,484	836	1,110	*1,460	1,684	8,404	*1,532
12 ...	1,766	3,900	12,360	2,800	1,940	*1,292	1,000	1,176	1,484	1,364	9,240	1,804
13 ...	3,029	*8,164	*18,200	2,642	3,600	1,340	1,000	1,340	1,292	1,292	*9,144	1,804
14 ...	4,300	7,340	23,300	2,706	3,800	1,804	978	*1,268	956	1,606	8,750	1,850
15 ...	4,665	6,470	27,900	2,930	*3,328	2,150	1,000	630	1,000	2,706	7,472	1,850
16 ...	*4,448	5,450	23,700	2,900	2,642	2,030	1,000	1,244	890	*3,500	6,176	1,880
17 ...	4,265	4,484	17,950	*2,548	2,610	1,804	*956	1,000	872	4,411	4,592	2,000
18 ...	3,880	3,950	14,800	2,240	2,362	1,532	1,000	890	*508	3,775	3,880	*1,850
19 ...	3,530	3,600	13,750	2,548	2,150	*1,154	1,436	956	800	2,996	3,260	1,940
20 ...	3,420	*3,362	*12,304	2,865	2,548	1,850	1,154	934	818	2,706	*2,963	2,090
21 ...	4,300	3,775	12,804	3,775	2,865	2,150	1,220	*956	1,132	2,674	3,294	2,098
22 ...	5,650	3,985	13,582	4,265	*2,706	2,000	1,220	818	1,044	2,963	3,294	2,540
23 ...	*5,650	3,915	13,032	5,250	2,424	1,804	1,220	1,110	890	*4,374	3,029	4,230
24 ...	6,176	3,600	11,280	*6,386	2,548	1,658	*934	2,150	1,460	5,490	3,294	5,610
25 ...	5,970	3,230	9,390	7,252	2,770	1,340	1,292	2,610	*2,738	4,592	2,800	5,450
26 ...	5,530	2,930	8,260	8,950	2,865	*1,220	2,000	3,095	2,865	4,055	2,548	*5,130
27 ...	4,739	*2,770	*6,900	10,140	3,775	1,066	1,710	3,130	2,770	5,570	*1,658	4,300
28 ...	3,950	3,095	6,176	9,690	4,055	1,340	1,340	*2,706	2,393	6,680	2,030	3,420
29 ...	3,396	......	6,302	7,780	*3,362	1,316	1,364	2,000	2,770	6,558	2,331	3,095
30 ...	*2,900	......	7,340	5,850	3,230	1,292	1,292	1,460	1,850	*5,250	2,610	3,705
31 ...	2,930	......	7,924	......	3,130	......	*1,508	1,658	......	3,950	......	4,813
Mean.	3,402	3,806	9,609	4,654	3,174	1,639	1,128	1,495	1,483	3,138	3,932	2,720

*Sunday. †Water drawn down for repairs, beginning August 22.

***Mean Daily flow in Second-feet of Black River at Huntingtonville Dam, Jefferson County, N. Y.* —(Continued).**

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1 ...	*4,230	1,940	3,565	4,125	18,000	3,095	1,460	956	978	*956	2,240	1,176
2 ...	3,985	2,090	3,260	*3,915	16,150	2,393	*1,022	1,000	1,244	956	3,420	1,198
3 ...	3,396	2,030	3,230	3,800	14,800	2,240	1,000	1,110	*630	1,460	4,055	*1,412
4 ...	3,600	2,000	3,328	3,565	13,694	*1,804	956	1,000	1,110	1,340	3,230	2,090
5 ...	10,396	*2,000	*3,880	3,600	12,080	1,658	1,388	854	480	1,176	*2,900	2,060
6 ...	9,740	2,000	5,170	3,985	9,490	1,710	1,436	*678	1,000	1,022	2,706	1,658
7 ...	8,750	2,000	5,970	4,520	*7,516	1,658	1,580	800	890	1,022	2,393	1,460
8 ...	*8,750	2,000	5,530	6,900	5,090	1,532	1,460	890	1,022	*678	1,850	1,220
9 ...	7,972	2,000	5,090	*8,116	4,125	1,340	*1,176	1,000	1,066	1,044	1,832	1,198
10 ...	6,812	1,984	4,592	8,308	3,705	1,532	1,880	854	*1,022	854	1,460	*1,110
11 ...	5,450	1,850	4,125	8,950	3,362	*1,220	1,340	728	1,220	956	1,412	1,658
12 ...	4,484	*1,984	*5,210	10,656	3,705	1,532	2,150	678	678	800	*1,066	4,850
13 ...	4,055	2,240	8,164	11,072	3,880	1,340	1,738	*710	1,340	818	1,436	8,404
14 ...	3,950	2,240	8,020	12,136	*3,260	1,340	1,532	728	630	818	1,132	8,404
15 ...	*4,702	2,240	7,736	13,694	2,930	1,132	1,412	1,044	694	*818	1,220	7,928
16 ...	5,810	2,150	6,900	*13,806	3,029	1,460	*1,022	1,110	1,176	694	1,364	*5,650
17 ...	5,890	2,210	6,680	14,086	3,095	1,460	934	1,066	*764	1,000	1,460	*2,706
18 ...	5,450	1,984	5,850	14,086	3,705	*1,460	1,000	1,606	1,220	978	1,460	3,294
19 ...	5,250	*1,850	*5,250	14,700	3,029	1,658	1,292	1,000	1,176	1,044	*1,066	4,702
20 ...	3,095	2,000	4,629	17,400	3,775	1,340	956	*710	710	1,088	1,110	5,450
21 ...	3,740	2,090	4,665	20,900	*4,484	1,220	956	522	800	854	1,244	6,470
22 ...	*3,362	2,362	4,629	24,400	4,337	1,220	1,000	1,000	1,066	*522	1,176	6,680
23 ...	3,195	2,963	4,665	*24,950	3,775	1,220	*978	890	710	1,000	1,066	5,050
24 ...	2,930	3,465	5,050	25,000	3,500	1,340	1,220	854	*630	956	1,198	*4,337
25 ...	2,770	3,420	4,930	24,850	2,900	*1,268	1,340	1,244	1,198	1,066	1,110	4,300
26 ...	2,900	*3,095	*4,776	24,950	2,424	1,292	1,132	1,110	1,110	1,110	*782	2,930
27 ...	2,610	3,420	4,592	24,300	2,485	1,532	1,044	*854	1,198	1,110	1,088	2,548
28 ...	2,393	3,530	4,230	23,450	*2,393	1,340	1,088	872	1,198	1,110	1,132	2,300
29 ...	*2,000	....	4,090	22,250	2,362	1,176	836	890	1,198	*1,066	1,066	2,240
30 ...	2,300	....	4,592	*20,350	3,362	1,340	*550	1,000	1,532	1,292	912	2,240
31 ...	2,120	....	4,195	....	3,420	......	458	956	......	1,940	......	*1,804
Mean.	4,712	2,326	5,051	13,894	5,609	1,528	1,205	897	990	1,018	1,652	3,501
1900.												
1 ...	1,766	2,300	2,865	*3,800	11,280	2,000	*978	1,340	1,240	780	1,610	9,900
2 ...	1,710	2,300	2,610	4,265	11,020	1,710	978	1,110	*1,200	1,440	1,535	*8,000
3 ...	1,710	2,240	2,579	5,370	10,812	2,000	1,000	1,220	1,010	1,200	1,440	6,400
4 ...	1,710	*2,060	*2,770	6,050	9,740	*2,060	854	1,000	†	960	*1,120	5,650
5 ...	1,710	2,060	2,770	7,384	9,000	2,200	1,000	*854	......	1,120	1,370	5,700
6 ...	1,710	2,150	2,930	7,560	*7,780	2,000	1,110	694	......	1,200	1,120	5,650
7 ...	*1,710	2,200	2,865	9,740	6,900	2,150	1,110	1,000	......	*780	1,245	5,700
8 ...	2,300	2,150	2,674	*12,192	6,050	2,424	*764	1,154	......	1,010	......	4,900
9 ...	2,362	4,850	2,930	10,760	5,650	2,579	1,268	690	*	960	......	*4,180
10 ...	2,362	5,800	2,930	10,760	6,602	2,485	1,244	820	......	1,240	......	3,300
11 ...	2,240	*5,770	*2,674	10,240	7,560	*2,610	1,340	780	760	980	*2,990	3,460
12 ...	2,150	5,250	2,930	10,344	6,050	2,000	1,268	*1,610	740	870	2,895	3,145
13 ...	2,270	6,344	2,674	9,490	*5,770	2,030	1,532	1,010	780	780	2,475	2,990
14 ...	*1,710	11,458	2,610	7,340	5,650	1,766	1,580	1,490	780	*580	2,120	2,780
15 ...	1,940	12,304	2,610	*6,386	5,250	1,580	*1,198	1,730	740	820	2,250	3,080
16 ...	1,850	14,030	2,610	7,208	5,250	1,580	1,460	1,680	*390	780	1,485	*2,200
17 ...	1,580	13,470	2,610	9,036	5,650	1,268	1,220	1,535	740	1,010	1,780	2,780
18 ...	1,710	*11,280	*2,548	10,604	5,530	*1,154	1,268	1,240	1,120	1,050	*1,680	2,255
19 ...	1,940	9,590	2,610	20,100	5,250	1,460	1,340	*2,120	1,100	1,050	3,900	2,595
20 ...	2,930	7,924	2,610	27,050	*5,170	1,364	1,766	1,010	1,120	1,050	8,600	2,830
21 ...	*5,930	5,770	2,610	30,000	4,930	1,044	1,580	1,240	980	*740	9,175	2,780
22 ...	6,260	5,130	3,420	*29,500	4,374	1,044	*1,460	1,200	980	960	8,900	*2,535
23 ...	5,850	5,130	4,020	27,700	4,265	1,110	1,556	810	*1,055	1,240	8,600	2,535
24 ...	5,770	4,850	3,915	25,200	3,705	1,110	1,766	480	1,240	1,440	7,820	3,640
25 ...	4,850	*4,230	*3,600	23,300	3,161	*1,176	1,340	810	1,780	1,980	*6,280	5,450
26 ...	4,125	3,775	3,600	21,750	3,420	1,340	1,220	*500	1,490	2,340	6,680	5,280
27 ...	3,670	3,095	3,260	20,000	*2,706	978	2,150	780	1,295	2,120	9,900	4,900
28 ...	*3,420	2,996	3,260	17,050	2,485	836	1,850	780	1,200	*1,605	12,250	4,220
29 ...	3,195	....	3,260	*14,800	2,150	764	*1,316	1,780	915	1,860	13,900	3,810
30 ...	2,865	....	3,260	12,752	2,000	1,044	1,268	1,440	*800	1,885	12,250	......
31 ...	2,548	....	3,465	....	1,904	......	1,176	1,240	......	1,935	......	*......
Mean.	2,834	5,734	2,970	13,926	5,711	1,630	1,321	1,134	1,020	1,218	5,014	4,230

*Sunday. †Sluice gates open.

Mean Daily flow in Second-feet of Black River at Huntingtonville Dam, Jefferson County. N. Y.

[Drainage area, 1,889 square miles.]

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1897.												
1	......	......	1,220	5,050	8,550	3,362	978	*1,710	......	......	598	6,812
2	......	......	......	5,170	*7,692	2,865	956	1,606	......	......	872	5,850
3	......	......	......	5,850	6,514	2,300	1,066	1,580	......	......	1,738	2,835
4	......	......	......	*6,176	5,890	2,835	*890	1,292	......	......	2,610	2,450
5	......	......	2,060	8,020	6,602	3,328	782	990	......	......	2,362	*3,425
6	......	......	2,865	8,650	6,218	*3,095	646	782	......	......	1,850	4,665
7	......	......	*3,230	9,590	5,970	2,579	1,066	630	......	......	*1,850	5,290
8	......	......	3,396	10,916	4,739	2,300	710	*362	......	......	2,120	5,490
9	......	......	3,600	11,540	*3,705	2,000	678	536	......	......	2,150	5,770
10	......	......	4,230	11,540	2,900	4,484	746	630	......	......	2,800	5,850
11	......	......	5,650	*10,500	2,900	6,176	*536	2,930	......	......	4,374	7,428
12	......	......	5,970	8,750	2,455	6,428	582	6,812	......	......	4,411	*7,692
13	......	......	6,602	7,340	2,515	*5,970	836	7,252	......	......	4,850	7,120
14	......	......	*6,260	6,856	3,029	4,411	614	5,850	......	1,014	*4,020	6,680
15	......	......	5,650	7,120	4,592	3,362	1,110	*3,420	......	1,220	3,670	7,252
16	......	......	5,130	7,924	*5,170	2,770	1,198	2,362	......	2,455	3,029	8,068
17	......	......	4,300	8,850	4,665	2,424	1,110	1,710	......	*854	4,125	8,500
18	......	......	3,950	*9,240	4,125	2,030	*1,000	2,000	......	1,176	5,170	8,308
19	......	......	3,880	9,690	3,328	1,658	934	2,424	......	1,110	5,210	*6,092
20	......	......	2,240	9,390	3,062	*1,460	978	1,804	......	956	3,950	3,420
21	......	......	*8,600	9,690	2,485	2,090	1,000	1,292	......	854	*2,930	3,195
22	......	1,460	8,550	9,290	2,642	2,706	890	*†1,022	......	800	3,362	3,195
23	......	1,460	10,916	8,260	*3,095	2,270	728	978	......	782	2,835	3,130
24	......	2,610	16,500	7,648	2,424	1,804	630	694	......	*480	2,150	2,770
25	......	1,850	4,250	*9,144	2,515	1,388	*480	522	......	956	1,850	2,393
26	......	3,420	12,080	11,176	3,950	1,198	1,000	566	......	746	3,396	*2,515
27	......	......	10,760	12,640	4,776	*978	934	582	......	782	6,218	2,270
28	......	......	*7,924	14,142	4,374	1,198	890	322	......	854	*9,144	2,130
29	......	......	6,176	13,806	4,020	978	1,220	*1,254	......	710	9,890	2,060
30	......	......	5,450	10,552	*3,775	934	1,940	......	......	710	8,116	2,000
31	......	......	5,450	......	3,600	......	2,000	......	......	*678	......	1,804
Mean.	......	2,160	6,317	9,484	4,267	2,713	940	2,280	......	954	4,155	4,725
1898.												
1	1,738	2,770	2,300	7,340	*4,411	2,770	1,436	1,110	1,244	1,556	3,095	2,548
2	*2,270	2,930	2,610	6,646	3,362	2,362	1,316	1,580	1,220	*1,022	2,706	2,455
3	1,940	2,835	2,300	*5,050	3,530	2,030	*872	1,132	1,110	1,088	2,610	2,455
4	2,000	2,610	2,300	3,950	3,705	1,804	800	1,292	*330	1,110	2,393	*2,240
5	2,120	2,770	2,150	3,600	3,915	*1,738	1,110	1,460	1,340	1,412	2,300	2,300
6	2,000	*2,455	*2,150	3,600	4,776	1,556	1,088	1,880	1,766	2,770	*2,210	2,240
7	1,850	2,610	2,150	3,420	4,411	1,532	1,176	*1,710	1,684	3,420	3,095	1,940
8	1,580	2,610	2,210	3,362	*3,420	1,340	1,022	1,580	2,060	2,865	2,930	1,804
9	*1,850	2,455	2,674	3,095	2,770	1,176	956	1,244	1,940	*1,910	2,930	1,658
10	1,804	2,300	3,420	*3,029	2,930	1,244	*728	1,110	1,804	1,940	2,930	1,684
11	1,804	3,195	6,386	3,029	2,455	1,484	836	1,110	*1,460	1,684	8,404	*1,532
12	1,766	3,900	12,360	2,800	1,940	*1,292	1,000	1,176	1,484	1,364	9,240	1,804
13	3,029	*8,164	*18,200	2,642	3,600	1,340	1,000	1,340	1,292	1,292	*9,144	1,804
14	4,300	7,340	23,300	2,706	3,800	1,804	978	*1,268	956	1,606	8,750	1,850
15	4,665	6,470	27,900	2,930	*3,328	2,150	1,000	630	1,000	2,706	7,472	1,850
16	*4,448	5,450	23,700	2,900	2,642	2,030	1,000	1,244	890	*3,500	6,176	1,880
17	4,265	4,484	17,950	*2,548	2,610	1,804	*956	1,000	872	4,411	4,592	2,000
18	3,880	3,950	14,800	2,240	2,362	1,532	1,000	890	*508	3,775	3,880	*1,850
19	3,530	3,600	13,750	2,548	2,150	*1,154	1,436	956	800	2,996	3,260	1,940
20	3,420	*3,362	*12,304	2,865	2,548	1,850	1,154	934	818	2,706	*2,963	2,090
21	4,300	3,775	12,804	3,775	2,865	2,150	1,220	*956	1,132	2,674	3,294	2,098
22	5,650	3,985	13,582	4,265	*2,706	2,000	1,220	818	1,044	2,963	3,294	2,540
23	*5,650	3,915	13,032	5,250	2,424	1,804	1,220	1,110	890	*4,374	3,029	4,230
24	6,176	3,600	11,280	*6,386	2,548	1,658	*934	2,150	1,460	5,490	3,294	5,610
25	5,970	3,230	9,390	7,252	2,770	1,340	1,292	2,610	*2,738	4,592	2,800	5,450
26	5,530	2,930	8,260	8,950	2,865	*1,220	2,000	3,095	2,865	4,055	2,548	*5,130
27	4,739	*2,770	*6,900	10,140	3,775	1,066	1,710	3,130	2,770	5,570	*1,658	4,300
28	3,950	3,095	6,176	9,690	4,055	1,340	1,340	*2,706	2,393	6,680	2,030	3,420
29	3,396	......	6,302	7,780	*3,362	1,316	1,364	2,000	2,770	6,558	2,331	3,095
30	*2,900	......	7,340	5,850	3,230	1,292	1,292	1,460	1,850	*5,250	2,610	3,705
31	2,930	......	7,924	......	3,130	......	*1,508	1,658	......	3,950	......	4,813
Mean.	3,402	3,806	9,609	4,654	3,174	1,639	1,128	1,495	1,483	3,138	3,932	2,720

*Sunday. †Water drawn down for repairs, beginning August 22.

***Mean Daily flow in Second-feet of Black River at Huntingtonville Dam, Jefferson County, N. Y.* —(Continued).**

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1 ...	*4,230	1,940	3,565	4,125	18,000	3,095	1,460	956	978	*956	2,240	1,176
2 ...	3,985	2,090	3,260	*3,915	16,150	2,393	*1,022	1,000	1,244	956	3,420	1,198
3 ...	3,396	2,030	3,230	3,800	14,800	2,240	1,000	1,110	*630	1,460	4,055	*1,412
4 ...	3,600	2,000	3,328	3,565	13,694	*1,804	956	1,000	1,110	1,340	3,230	2,090
5 ...	10,396	*2,000	*3,880	3,600	12,080	1,658	1,388	854	480	1,176	*2,900	2,060
6 ...	9,740	2,000	5,170	3,985	9,490	1,710	1,436	*678	1,000	1,022	2,706	1,658
7 ...	8,750	2,000	5,970	4,520	*7,516	1,658	1,580	800	890	1,022	2,393	1,460
8 ...	*8,750	2,000	5,530	6,900	5,090	1,532	1,460	890	1,022	*678	1,850	1,220
9 ...	7,972	2,000	5,090	*8,116	4,125	1,340	*1,176	1,000	1,066	1,044	1,832	1,198
10 ...	6,812	1,984	4,592	8,308	3,705	1,532	1,880	854	*1,022	854	1,460	*1,110
11 ...	5,450	1,850	4,125	8,950	3,362	*1,220	1,340	728	1,220	956	1,412	1,658
12 ...	4,484	*1,984	*5,210	10,656	3,705	1,532	2,150	678	678	800	*1,066	4,850
13 ...	4,055	2,240	8,164	11,072	3,880	1,340	1,738	*710	1.340	818	1,436	8,404
14 ...	3,950	2,240	8,020	12,136	*3,260	1,340	1,532	728	630	818	1,132	8,404
15 ...	*4,702	2,240	7,736	13,694	2,930	1,132	1,412	1,044	694	*818	1,220	7,928
16 ...	5,810	2,150	6,900	*13,806	3,029	1,460	*1,022	1,110	1,176	694	1,364	*5,650
17 ...	5,890	2,210	6,680	14,086	3,095	1,460	934	1,066	*764	1,000	1,460	*2,706
18 ...	5,450	1,984	5,850	14,086	3,705	*1,460	1,000	1,606	1,220	978	1,460	3,294
19 ...	5,250	*1,850	*5,250	14,700	3,029	1,658	1,292	1,000	1,176	1,044	*1,066	4,702
20 ...	3,095	2,000	4,629	17,400	3,775	1,340	956	*710	710	1,088	1,110	5,450
21 ...	3,740	2,090	4,665	20,900	*4,484	1,220	956	522	800	854	1,244	6,470
22 ...	*3,362	2,362	4,629	24,400	4,337	1,220	1,000	1,000	1,066	*522	1,176	6,680
23 ...	3,195	2,963	4,665	*24,950	3,775	1,220	*978	890	710	1,000	1,066	5,050
24 ...	2,930	3,465	5,050	25,000	3,500	1,340	1,220	854	*630	956	1.198	*4,337
25 ...	2,770	3,420	4,930	24,850	2,900	*1,268	1,340	1,244	1,198	1,066	1,110	4,300
26 ...	2,900	*3,095	*4,776	24,950	2,424	1,292	1,132	1,110	1,110	1,110	*782	2,930
27 ...	2,610	3,420	4,592	24,300	2,485	1,532	1,044	*854	1,198	1,110	1,088	2,548
28 ...	2,393	3,530	4,230	23,450	*2,393	1,340	1,088	872	1,198	1,110	1,132	2,300
29 ...	*2,000	....	4,090	22,250	2,362	1,176	836	890	1,198	*1,066	1,066	2,240
30 ...	2,300	....	4,592	*20,350	3,362	1,340	*550	1,000	1,532	1,292	912	2,240
31 ...	2,120	....	4,195	....	3,420	......	458	956	......	1,940	......	*1,804
Mean.	4,712	2,326	5,051	13,894	5,609	1,528	1,205	897	990	1,018	1,652	3,501
1900.												
1 ...	1,766	2,300	2,865	*3,800	11,280	2,000	*978	1,340	1,240	780	1,610	9,900
2 ...	1,710	2,300	2,610	4,265	11,020	1,710	978	1,110	*1,200	1,440	1,535	*8,000
3 ...	1,710	2,240	2,579	5,370	10,812	2,000	1,000	1,220	1,010	1,200	1,440	6,400
4 ...	1,710	*2,060	*2,770	6,050	9,740	*2,060	854	1,000	†	960	*1,120	5,650
5 ...	1,710	2,060	2,770	7,384	9,000	2,200	1,000	*854	......	1,120	1,370	5,700
6 ...	1,710	2,150	2,930	7,560	*7,780	2,000	1,110	694	......	1,200	1,120	5,650
7 ...	*1,710	2,200	2,865	9,740	6,900	2,150	1,110	1,000	......	*780	1,245	5,700
8 ...	2,300	2,150	2,674	*12,192	6,050	2,424	*764	1,154	......	1,010	......	4,900
9 ...	2,362	4,850	2,930	10,760	5,650	2,579	1,268	690	*	960	......	*4,180
10 ...	2,362	5,800	2,930	10,760	6,602	2,485	1,244	820	......	1,240	......	3,300
11 ...	2,240	*5,770	*2,674	10,240	7,560	*2,610	1,340	780	760	980	*2,990	3,460
12 ...	2,150	5,250	2,930	10,344	6,050	2,000	1,268	*1,610	740	870	2,895	3,145
13 ...	2,270	6,344	2,674	9,490	*5,770	2,030	1,532	1,010	780	780	2,475	2,990
14 ...	*1,710	11,458	2,610	7,340	5,650	1,766	1,580	1,490	780	*580	2,120	2,780
15 ...	1,940	12,304	2,610	*6,386	5,250	1,580	*1,198	1,730	740	820	2,250	3,080
16 ...	1,850	14,030	2,610	7,208	5,250	1,580	1,460	1,680	*390	780	1,485	*2,200
17 ...	1,580	13,470	2,610	9,006	5,650	1,268	1,220	1,535	740	1,010	1,780	2,780
18 ...	1,710	*11,280	*2,548	10,604	5,530	*1,154	1,268	1,240	1,120	1,050	*1,680	2,255
19 ...	1,940	9,590	2,610	20,100	5,250	1,460	1,340	*2,120	1,100	1,050	3,900	2,595
20 ...	2,930	7,924	2,610	27,050	*5,170	1,364	1,766	1,010	1,120	1,050	8,600	2,830
21 ...	*5,930	5,770	2,610	30,000	4,930	1,044	1,580	1,240	980	*740	9,175	2,780
22 ...	6,260	5,130	3,420	*29,500	4,374	1,044	*1,460	1,200	980	960	8,900	*2,535
23 ...	5,850	5,130	4,020	27,700	4,265	1,110	1,556	810	*1,055	1,240	8,600	2,535
24 ...	5,770	4,850	3,915	25,200	3,705	1,110	1,766	480	1,240	1,440	7,820	3,640
25 ...	4,850	*4,230	*3,600	23,300	3,161	*1,176	1,340	810	1,780	1,980	*6,280	5,450
26 ...	4,125	3,775	3,600	21,750	3,420	1,340	1,220	*500	1,490	2,340	6,680	5,280
27 ...	3,670	3,095	3,260	20,000	*2,706	978	2,150	780	1,295	2,120	9,900	4,900
28 ...	*3,420	2,996	3,260	17,050	2,485	836	1,850	780	1,200	*1,605	12,250	4,220
29 ...	3,195	....	3,260	*14,800	2,150	764	*1,316	1,780	915	1,860	13,900	3,810
30 ...	2,865	....	3,260	12,752	2,000	1,044	1,268	1,440	*800	1,885	12,250	......
31 ...	2,548	....	3,465	....	1,904	......	1,176	1,240	......	1,935	......	*.....
Mean.	2,834	5,734	2,970	13,926	5,7[illegible]	1,630	1,32[illegible]	1,134	1,020	1,218	5,014	4,230

*Su[illegible] Sluice[illegible]

Mean Daily Flow in Second-feet of Black River at Huntington[illegible]lle Dam, Jeffer[illegible] County, N. Y.
—(Concluded).

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oc[illegible]	Nov.	Dec.
1901.												
1 ...	3,530	2,455	2,930	12,080	9,120	5,250	2,225	3,863	5,750	3,950	1,925	*2,532
2 ...	2,930	2,378	2.531	11,150	8,260	*5,450	2,000	3,178	7,010	3,420	1,850	4,574
3 ...	2,610	*2,000	*2,225	11,280	7,120	5,950	2,000	2,300	7,450	3,420	*1,850	5,250
4 ...	2,610	2,770	2,455	11,410	6,680	6,470	1,340	*1,850	5,950	3,600	1,710	4,038
5 ...	2,455	2,300	2,610	11,020	*6,630	6,900	1,580	1,580	5,450	3,515	1,785	3,345
6 ...	*2,531	1,220	2,610	10,370	5,350	6,790	1,520	1,710	3,863	*3,260	1,850	2,930
7 ...	2,770	2,378	2,658	*9,990	4,758	6,856	*1,460	1,850	2,800	3,260	[illegible].895	2,455
8 ...	2,610	2,075	2,610	11,020	4,393	7,900	1,710	2,455	*1,925	3,012	[illegible]	*2,225
9 ...	2,770	2,000	2,610	11,280	3,600	*8,750	1,850	2,770	......	2,610	[illegible]	2,532
10 ...	3,012	*1,910	*2,455	11,410	3,345	8,875	1,580	2,610	2,000	2,610	[illegible],165	5,850
11 ...	3,260	2,690	2,930	10,630	3,515	8,380	1,520	*2,850	1,8[illegible]	2,579	1,580	8,020
12 ...	3,178	2,455	3,420	9,740	*4,574	7,120	1,644	3,600	1,925	2,532	1,710	8,020
13 ...	*3,178	2,225	4,032	9,240	5,450	5,750	1,520	3,311	2,377	*2,455	3,515	8,260
14 ...	3,178	2,300	4,300	*9,490	6,155	4,665	*1,280	2,770	3,260	3,77[illegible]	4,950	†
15 ...	3,095	2,225	4,213	11,020	5,650	3,420	1,580	2,150	*2,930	4,3[illegible]	4,665	*
16 ...	2,930	2,300	4,213	11,675	4,950	*2,850	1,280	1,984	3,775	[illegible]484	3,950	......
17 ...	3,012	*2,000	*3,775	13,750	4,213	2,300	1,165	1,644	3,775	[illegible],484	*3,420	......
18 ...	3,178	*2,300	3,950	16,300	3,685	2,270	1,143	*1,460	4,038	[illegible],050	3,600	......
19 ...	3,260	2,378	4,125	19,000	*3,515	1,962	1,280	1,580	3,515	4,758	3,260	......
20 ...	*2.770	2,610	4,032	21,000	4,665	1,850	1,165	1,520	3,178	*4,213	3,095	......
21 ...	3,095	2,610	5,050	*21,000	5,050	3,008	*800	1,644	2,610	4,038	2,930	......
22 ...	3,012	2,770	5,850	21,400	4,850	6,150	1,460	1,520	*2,376	3,862	2,850	*
23 ...	2,930	2,850	5,850	22,650	4,484	*7,670	1,400	1,580	2,075	3,345	[illegible],690	......
24 ...	2,770	*2,690	*5,450	24,800	4,300	7,780	1,400	2,000	2,000	2,770	*2,930	......
25 ...	2,690	3.260	6,365	23,350	4,300	6,260	1,436	*2,000	1,850	2,690	3,950	......
26 ...	2,610	2,770	10,760	19,700	*4,076	5,350	1,400	1,785	1,850	2,770	3,600	......
27 ...	*2,225	2,930	16,800	16,800	4,038	4,850	1,165	1,710	1,735	*2,610	2,300	......
28 ...	2,610	2,930	18,200	*14,520	4,336	3,420	*1,165	1,580	1.580	2,455	3,013	......
29 ...	2,455	....	17,800	12,780	4,178	2,930	1,850	1,340	*1,165	2,532	3,095	*
30 ...	2,531	....	15,900	10,760	4,813	*2,300	3,008	1,460	2,610	2,376	2,850	......
31 ...	2,378	....	*14,050	....	5,150	......	4,484	2,530	......	2,075	......	......
Mean.	2,844	2,421	6,024	14,354	5,007	5,316	1,626	2,135	3,089	3,316	2,712	......

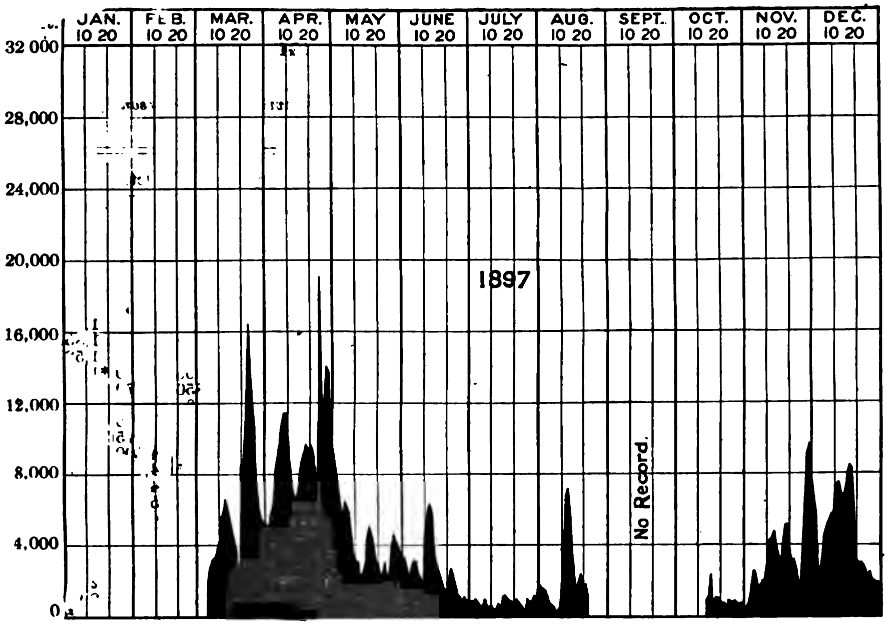
*Sunday. †Dam injured by high water.

Mean Monthly Run-off of Black River at Huntingtonville Dam, Jefferson County, N. Y.

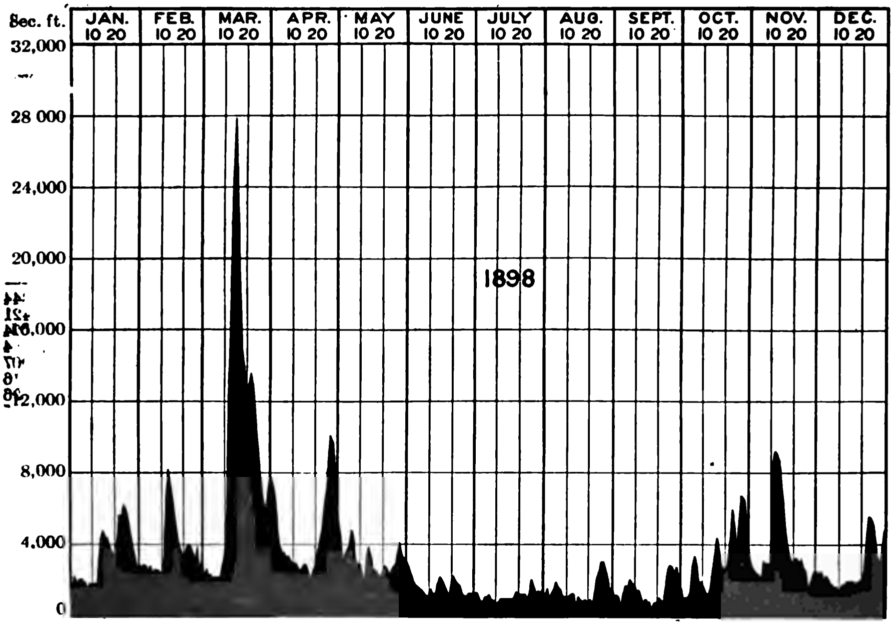
[Drainage area, 1,889 square miles.]

MEAN MONTHLY FLOW IN SECOND-FEET.

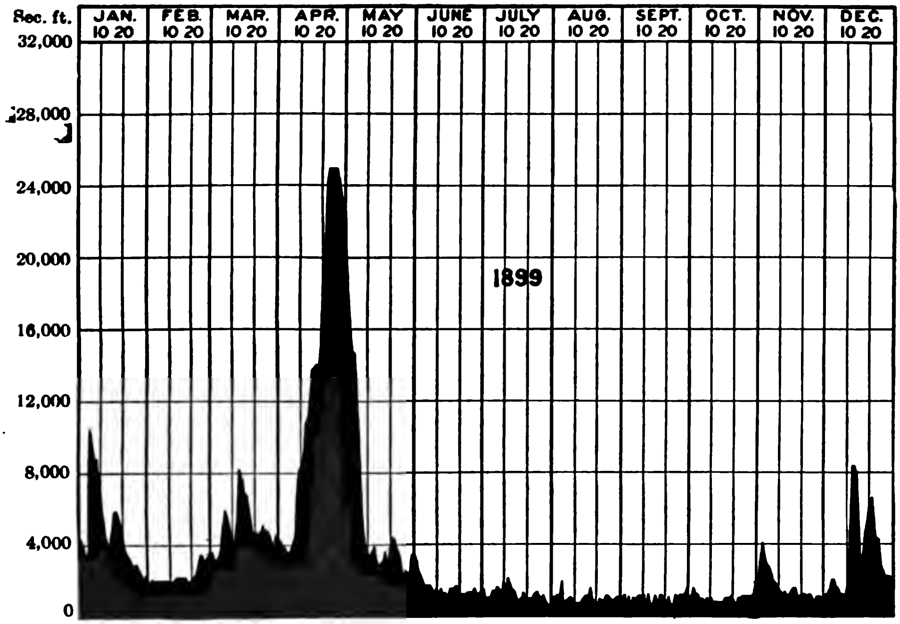
MONTH.	1897.	1898.	1899.	1900.	1901.
January	....	3,402	4,712	2,834	2,8[illegible]
February	2,160	3,806	2,326	5,734	2,4[illegible]
March	6,317	9,609	5,051	2,970	6,0[illegible]
April	9,484	4,654	13,894	13,926	14,35[illegible]
May	4,267	3,174	5,609	5,711	5,0[illegible]
June	2,713	1,639	1,528	1,630	5,31[illegible]
July	879	1,128	1,205	1,321	1,62[illegible]
August	2,280	1,495	897	1,134	2,135
September	....	1,483	990	1,020	3,089
October	954	3,138	1,018	1,218	3,316
November	4,155	3,932	1,652	5,014	2,712
December	4,725	2,720	3,501	4,230	....
Year	....	....	....	....	....



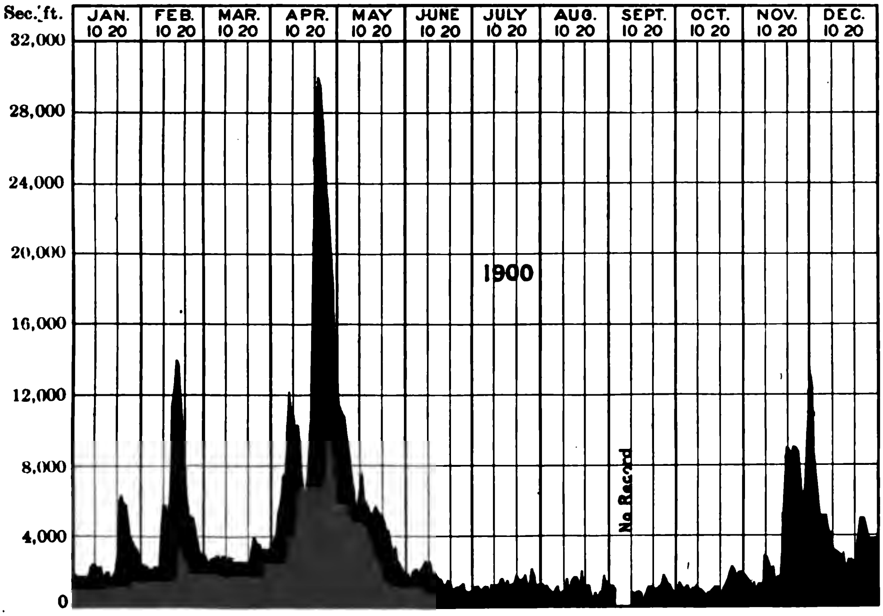
Discharge of Black River at Huntingtonville Dam, Jefferson County, N. Y., 1897



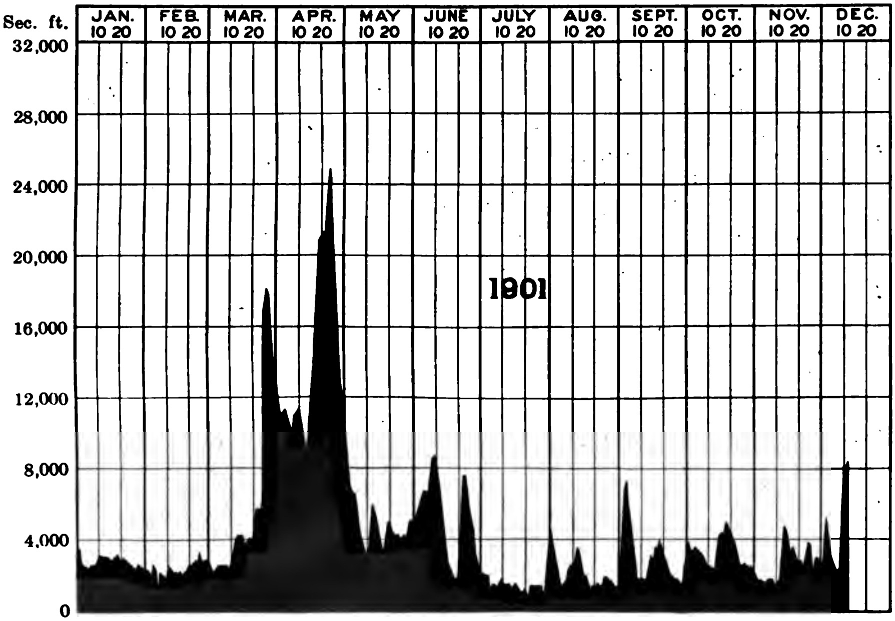
Discharge of Black River at Huntingtonville Dam, Jefferson County, N. Y., 1898.



Discharge of Black River at Huntingtonville Dam, Jefferson County, N. Y., 1899.



Discharge of Black River at Huntingtonville Dam, Jefferson County N. Y., 1900.



Discharge of Black River at Huntingtonville Dam Jefferson County, N. Y., 1901.

Mean Monthly Run-off of Black River at Huntingtonville Dam, Jefferson County, N. Y.—(Continued).

SECOND-FEET PER SQUARE MILE.

MONTH.	1897.	1898.	1899.	1900.	1901.
January	....	1.18	2.49	1.50	1.50
February	1.14	2.01	1.23	3.04	1.28
March	3.34	5.08	2.67	1.57	3.18
April	5.02	2.46	7.35	7.37	7.60
May	2.26	1.68	2.97	3.02	2.65
June	1.44	0.87	0.81	0.86	2.81
July	0.47	0.60	0.64	0.70	0.86
August	1.21	0.79	0.47	0.60	1.13
September	....	0.78	0.52	0.54	1.63
October	0.505	1.66	0.54	0.64	2.28
November	2.20	2.08	0.87	2.65	1.43
December	2.50	1.44	1.85	2.24	....
Year	....	....	....	....	....

INCHES ON DRAINAGE AREA.

MONTH.	1897.	1898.	1899.	1900.	1901.
January	....	1.36	2.77	1.73	1.73
February	1.18	2.09	1.28	3.16	1.33
March	3.85	5.77	3.08	1.81	3.66
April	5.60	2.74	8.20	8.22	8.51
May	2.60	1.86	3.42	3.48	3.05
June	1.60	0.97	0.90	0.96	3.15
July	0.54	0.69	0.73	0.80	0.99
August	1.39	0.91	0.54	0.69	1.30
September	....	0.87	0.58	0.60	1.83
October	0.58	1.91	0.60	0.71	2.62
November	2.45	2.32	0.97	2.96	1.60
December	2.88	1.66	1.52	2.58	....
Year	....	....	....	....	....

Estimated Flood Discharge of Black River in April, 1869. (*a*)

LOCATION.	Estimated discharge, second-feet.	Drainage area, square miles.	Second-feet per square mile.
Forestport	10,450	268	39
Lyons Falls	40,400	878	46
Carthage	39,529	1,812	21
Four miles below Carthage	39,009	1,824	21
Below Black River	39,137	1,869	21
Watertown	39,696	1,892	21
Ontario Paper Mill	28,337	1,903	15

(*a*) From data by L. L. Nichols, Black River Water Claims, Vol. 1, p. 640

BLACK RIVER NEAR FELTS MILLS, JEFFERSON COUNTY, N. Y.

The gauging station is located at the dam of the Black River Traction Company, near the village of Felts Mills. The dam is situated nine miles upstream from Watertown and seven miles upstream from the Huntingtonville gauging station on the same stream. The drainage area is estimated at 1,851 square miles, or 37.5 square miles less than that at Huntingtonville. The intervening area is mainly comprised in two small streams, Townsend Creek and Rutland Hollow Creek.

The dam is of squared timber and has a slope on the upstream face of 2.86 horizontal to 1 vertical. The crest is protected by boiler plate, and the downstream face is vertical, giving a free overfall. The main crest is 380.6 feet in length, is level and at elevation 587.96 above tide. There are two additional sections on the right-hand side; one at elevation 590.96 feet is 14.1 feet long, and the other at elevation 593.46 is 17.9 feet in length.

A similarly constructed dam 117.0 feet long at the left bank, serves as an auxiliary spillway and as a headrace wall. It has an average crest elevation of 591.00 feet.

The gauge is attached vertically to a crib at the juncture of the main and auxiliary spillways, eight feet upstream from the crest, and a correction is made to the gauge readings for velocity of approach during high water. The discharge over the spillways has been calculated by means of the weir formula using coefficients derived from Cornell Experiment No. 5 for a dam of similar cross-section. The dam was constructed in 1900, rests on limestone foundation, and is very nearly water-tight. The headrace is crossed by a bulkhead, no water wheels having been installed.

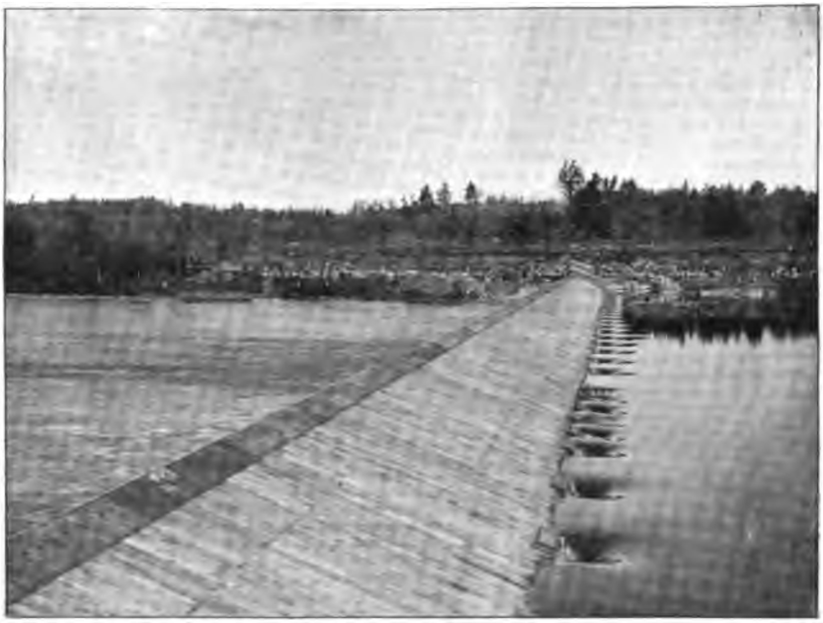
The gauge readings are taken twice daily, at 7 a. m. and again at 6 p. m., by A. H. Tucker.

A record of high water was kept at this dam May and June, 1901. The results are not available for publication at present.

Mean Monthly Run-off of Black River Traction Company's Dam, Near Felts Mills, Jefferson County, N. Y.

[Drainage area, 1,851 square miles.]

DATE.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
August, 1902	3,527	1.90	2.19
September, 1902	3,771	2.04	2.28
October, 1902	4,857	2.62	3.02
November, 1902	5,655	3.05	3.52
December, 1902	6,265	3.38	3.90



Black River: Dam at Felt's Mills, Jefferson County, N. Y., during construction in 1902.

Mean Daily Flow in Second-feet, of Black River, near Felts Mills at Black River Traction Company's Dam, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1									3,460	4,220	7,180	.....
2									3,590	4,140	*6,200	.....
3									3,940	4,280	5,880	.....
4									3,860	3,860	5,100	.....
5									3,665	*3,180	4,500	.....
6									3,460	4,000	4,420	.....
7									*2,860	4,800	4,420	.....
8									4,080	4,800	4,500	.....
9									4,140	5,000	*4,420	.....
10									4,140	4,650	4,280	.....
11									5,245	4,650	4,220	.....
12									4,800	*3,940	4,280	.....
13									4,280	4,140	8,370	.....
14									*3,665	4,940	8,840	.....
15									4,080	5,310	9,080	.....
16									3,940	4,940	*7,285	.....
17									3,860	4,420	6,200	.....
18									3,805	4,360	5,880	.....
19									3,720	*4,080	5,780	.....
20									3,400	4,565	5,880	.....
21									*3,000	4,800	5,245	.....
22									3,720	5,100	5,245	.....
23									3,540	4,500	*4,500	.....
24									3,130	4,940	5,780	.....
25									3,265	4,360	5,160	.....
26									3,540	*4,420	4,720	.....
27									3,180	4,800	5,720	.....
28								......	*3,940	5,245	6,200	6,800
29								3,590	4,280	7,285	......	6,300
30								3,590	3,540	8,370	......	6,020
31								*3,400	......	8,465	......	5,800
Mean								3,527	3,771	4,857	......	6,265

*Sundays.

SALMON RIVER, ABOVE PULASKI, OSWEGO COUNTY, N. Y.

Salmon River rises in Lewis county, flows westward across Jefferson county, and enters the east end of Lake Ontario, near Pulaski. A current meter station was established on this stream, September 5, 1900. It is located at a highway bridge, locally called Fox Bridge, two miles above the village of Pulaski. The stream bed is of gravel and cobblestone, nearly flat. The gauge board is attached to the central pier of the bridge, and is divided in feet and decimals, from zero to 10 feet. Gauge readings are taken each morning and evening, by Hiram A. Walker. The capstone of the central pier, above the gauge, is used as a bench mark.

Elevation bench mark	100.00
Elevation gauge zero	88.41

The stream has a flood-plain on the left-hand side, over which the water passes during freshets. The average elevation of the flood-plain is 7.5 feet above gauge zero. There are two auxiliary channels spanned by short bridges, through which the water passes at times. The flow through these is included in the high water discharge measurements given below.

Current Meter Discharge Measurements of Salmon River near Pulaski, Oswego County, N.Y.

DATE.	Gauge height, feet.	Discharge second-feet.	Hydrographer.
September 4, 1900	1.03	102	R. E. Horton.
May 21, 1901	1.69	422	J. D. Luther.
May 13, 1901	2.14	824	R. E. Horton.
June 1, 1901	2.50	1,070	J. D. Luther.
April 12, 1901	3.40	2,536	R. E. Horton.
June 8, 1901	4.10	3,437	J. D. Luther.
April 24, 1901	4.30	3,476	R. E. Horton.

A current meter measurement of Salmon River at Stillwater bridge was made November 2, 1898, by W. D. Lockwood, the discharge being 403 second-feet.

Drainage Areas Tributary to Salmon River.

LOCATION.	Square miles.
Gauging station near Salmon Falls	191
Gauging station near Pulaski	264
Mouth of stream	285

Summary of Developed Water Powers on Salmon River.

No. of dam.	LOCATION.	Number of mills.	Head in feet.	H. P. of water wheels.	Number of operatives employed.	Manufacture.
1	Pulaski	2	10	136	10	Electric lighting, furniture.
2	Pulaski	1	4	30	2	Grist mill.
3	Pulaski	4	4–9	70	18	Woodworking, etc.
4	Pulaski	6	10–13	82	22	Wood and iron working and woolen mill.
5	Altmar	2	5–7	119	4	Grist and planing mills.
6	Stillwater	1	6	6	10	Saw mill.

Mean Daily Flow in Second-feet of Salmon River at Pulaski, Oswego County, N. Y.

[Drainage area, 264 square miles.]

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	....	....	....	....	....	....	....	....	.....	394	186	1,075
2	....	....	....	....	....	....	....	....	.....	330	186	905
3	....	....	....	....	....	....	....	....	.....	258	554	820
4	....	....	....	....	....	....	....	....	.....	210	522	1,075
5	....	....	....	....	....	....	....	....	.....	186	490	1,357
6	....	....	....	....	....	....	....	....	100	114	586	1,032
7	....	....	....	....	....	....	....	....	100	138	586	905
8	....	....	....	....	....	....	....	....	100	258	1,357	777
9	....	....	....	....	....	....	....	....	100	554	1,131	426
10	....	....	....	....	....	....	....	....	100	522	862	330
11	....	....	....	....	....	....	....	....	75	394	586	330
12	....	....	....	....	....	....	....	....	75	330	586	282
13	....	....	....	....	....	....	....	....	75	282	522	282
14	....	....	....	....	....	....	....	....	75	282	522	282
15	....	....	....	....	....	....	....	....	75	234	458	258
16	....	....	....	....	....	....	....	....	100	282	330	234
17	....	....	....	....	....	....	....	....	100	282	330	234
18	....	....	....	....	....	....	....	....	100	282	458	234
19	....	....	....	....	....	....	....	....	100	258	1,131	394
20	....	....	....	....	....	....	....	....	100	258	3,541	618
21	....	....	....	....	....	....	....	....	777	234	3,748	282
22	....	....	....	....	....	....	....	....	862	210	2,566	306
23	....	....	....	....	....	....	....	....	490	210	1,777	394
24	....	....	....	....	....	....	....	....	426	306	1,032	862
25	....	....	....	....	....	....	....	....	362	650	1,075	1,075
26	....	....	....	....	....	....	....	....	258	618	2,325	990
27	....	....	....	....	....	....	....	....	210	554	4,656	820
28	....	....	....	....	....	....	....	....	210	554	2,727	820
29	....	....	....	....	....	....	....	....	210	458	2,119	735
30	....	....	....	....	....	....	....	....	306	490	1,131	820
31	....	....	....	....	....	....	....	....	.....	490	.....	905
Mean	....	....	....	....	....	....	....	....	219	343	1,267	641
1901.												
1	†	†	†	1,244	7,640	1,301	306	458	5,276	1,301	586	282
2	....	....	....	1,357	3,439	1,131	282	362	2,051	990	426	426
3	....	....	....	1,777	1,244	1,188	282	258	1,301	1,131	362	330
4	....	....	....	2,566	1,075	1,583	282	234	735	1,470	306	306
5	....	....	....	2,405	1,032	2,051	282	186	554	1,470	330	382
6	....	....	....	2,727	947	1,527	306	186	458	1,131	330	282
7	....	....	....	3,130	650	1,131	330	330	394	1,032	330	234
8	....	....	....	2,727	490	4,057	394	282	362	905	282	234
9	....	....	....	2,727	458	2,486	458	258	306	820	282	258
10	....	....	....	2,727	490	1,301	426	490	282	1,244	282	241
11	....	....	....	2,119	947	1,131	394	522	362	650	306	3,954
12	....	....	....	3,130	862	905	330	490	490	394	1,414	2,188
13	....	....	....	2,808	862	618	306	394	905	777	4,284	2,325
14	....	....	....	2,119	735	490	306	330	258	1,470	2,256	4,284
15	....	....	....	4,057	618	458	282	282	618	1,131	1,357	*
16	....	....	....	4,408	554	426	282	306	1,914	1,032	1,131	*
17	....	....	....	4,656	650	394	258	282	1,075	1,527	1,075	*
18	....	....	....	*	554	394	234	234	947	1,640	990	3,645
19	....	....	....	5,276	490	426	186	234	735	1,470	948	1,914
20	....	....	....	.....	458	394	186	234	522	1,188	863	1,132
21	....	....	....	*	490	1.527	138	234	458	947	778	948
22	....	....	....	*	426	905	138	186	394	905	618	735
23	....	....	....	*	618	1,470	138	306	394	777	778	490
24	....	....	....	4,656	554	905	138	990	362	458	820	490
25	....	....	....	3,954	586	1,244	138	586	330	554	650	426
26	....	....	....	3,233	458	905	138	426	330	522	586	394
27	....	....	....	2,486	490	490	138	306	282	458	522	394
28	....	....	....	2,486	618	394	138	234	282	458	394	330
29	....	....	....	1,982	947	362	426	186	282	458	330	778
30	....	....	....	1,708	990	362	554	490	947	458	330	990
31	....	....	....	.....	1.301	.....	490	3,954	.....	458	.....	554
Mean	....	....	....	2,804	829	1.065	281	460	787	943	798	930

*Exceeds limit of rating curve. †Stream obstructed by ice.

Mean Daily Flow in Second-feet of Salmon River, at Pulaski, Oswego County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	....	....	....	....	....	....	....	394	294	378	692	708
2	....	....	....	....	....	....	....	1,640	330	330	618	618
3	....	....	....	....	....	....	....	884	378	378	570	674
4	....	....	....	....	....	....	....	650	330	330	554	2,135
5	....	....	....	....	....	....	....	490	474	282	258	1,244
6	....	....	....	....	....	....	....	535	282	570	522	692
7	....	....	....	....	....	....	....	554	294	246	650	586
8	....	....	....	....	....	....	....	820	378	258	586	538
9	....	....	....	....	....	....	....	820	362	777	388	442
10	....	....	....	....	....	....	....	692	1,470	586	474	554
11	....	....	....	....	....	....	....	820	799	506	474	708
12	....	....	....	....	....	....	....	1,325	586	426	474	798
13	....	....	....	....	....	....	....	798	474	394	1,914	841
14	....	....	....	....	....	....	....	1,442	394	618	1,552	1,011
15	....	....	....	....	....	....	....	490	362	884	1,131	1,032
16	....	....	....	....	....	....	....	410	346	692	976	1,340
17	....	....	....	....	....	....	....	394	282	998	735	1,340
18	....	....	....	....	....	....	....	442	246	506	692	1,301
19	....	....	....	....	....	....	....	756	220	650	820	1,110
20	....	....	....	....	....	....	....	692	246	735	905	990
21	....	....	....	....	....	....	....	554	234	618	756	862
22	....	....	....	....	....	....	....	554	246	522	692	1,015
23	....	....	....	....	....	....	862	671	234	570	1,215	883
24	....	....	....	....	....	....	714	586	234	634	1,010	1,098
25	....	....	....	....	....	....	714	474	234	798	820	1,131
26	....	....	....	....	....	....	607	410	246	671	735	1,011
27	....	....	....	....	....	....	538	394	294	708	862	905
28	....	....	....	....	....	....	671	362	294	947	1,157	777
29	....	....	....	....	....	....	535	306	306	1,301	798	884
30	....	....	....	....	....	....	346	294	378	976	862	905
31	....	....	....	....	....	....	362	282	.....	777	.....	841
Mean	....	....	....	....	....	....	594	611	375	615	796	934

Mean Monthly Run-off of Salmon River at Pulaski, Oswego County, N. Y.

[Drainage area, 264 square miles.]

MONTH.	SECOND-FEET.		SECOND-FEET PER SQUARE MILE.		INCHES ON DRAINAGE AREA.	
	1900.	1901.	1900.	1901.	1900.	1901.
January	....	....	....	....	....	....
February	....	....	....	....	....	....
March	....	....	....	....	....	....
April	....	2,894	....	10.95	....	12.21
May	....	829	....	3.14	....	3.61
June	....	1,065	....	4.02	....	4.50
July	....	281	....	1.06	....	1.22
August	....	460	....	1.74	....	2.00
September	219	787	.83	2.98	.93	3.34
October	343	943	1.30	3.57	1.50	4.12
November	1,267	798	4.81	3.02	5.39	3.37
December	641	930	2.43	3.52	2.79	4.06

Salmon River Falls: (110 feet) Oswego County, N. Y., 1902, undeveloped.
During high-water.

Mean Monthly Run-off of Salmon River, near Pulaski, Oswego County, N. Y.
[Drainage area, 264 square miles.]

MONTH.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
1902.			
January	....	....	....
February	....	....	....
March	....	....	....
April	....	....	....
May	....	....	....
June	....	....	....
July	594	2.25	2.59
August	611	2.32	2.67
September	375	1.42	1.58
October	615	2.33	2.69
November	796	3.02	3.37
December	934	3.54	4.08

DATE.	Gauge height, feet. (*a*)	Discharge second-feet.	Hydrographer.
1902.			
October 17	2.85	433	R. E. Horton.
July 23	3.29	842	H. R. Beebe.
July 2	3.74	1,392	Horton & Beebe.
July 5	4.73	2,889	H. R. Beebe.
July 6	4.83	2,916	H. R. Beebe.
July 6	4.86	2,881	H. R. Beebe.

(*a*) Referred to old, original, or board gauge datum.

There is an undeveloped water power with a precipitous fall of 110 feet at Salmon Falls. In November, 1898, a gauging station was established by United States Board of Engineers on Deep Waterways, at a dam one mile above these falls. This gauging station was abandoned in June, 1899.[a]

SALMON RIVER GAUGINGS, 1902.

Owing to obstruction of the stream by ice and resulting injury to the gauge, the Salmon River record was interrupted during the winter of 1901-2.

A new gauge was erected July 23, 1902, and the record resumed. The datum plane of the weight gauge is elevation 87.21 or 1.2 feet below the original gauge. All gauge readings and discharge measurements have been reduced to the original or board gauge datum. Gauge readings are taken twice daily by S. J. Fox. The gauge is of the weight-and-wire variety, with a fifteen foot decimal scale in a wooden box attached to the

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(*a*) See description U. S. Geol. Survey, Water Supply Paper, No. 36, p. 130.

horizontal chords of the bridge near the center of the right-hand span. The following current-meter discharge measurements have been made during 1902.

Salmon River, in common with other streams tributary to Eastern Lake Ontario, is subject to great obstruction by anchor-ice. Owing to this, separate discharge measurements are required for the winter season before the gauge readings for the ice period can be reduced to quantities of discharge. Arrangements have been made for the taking of such measurements during the coming winter.

WEST BRANCH OF FISH CREEK AT McCONNELLSVILLE, ONEIDA COUNTY, N. Y.

This stream rises in the northern part of Oneida county and flows in a southerly direction to its junction with the east branch at Taberg station, where it forms the main Fish Creek, which stream flows in a westerly direction, emptying into the east end of Oneida Lake. The lower part of the course of Fish Creek is shown on the Oneida atlas sheet of the United States Geological Survey.

The station is located at the Harlem dam in McConnellsville. This dam is of timber, having a slight leakage, which has been estimated at 10 second-feet. The dam is in two sections, forming an angle in plan, the length of the right-hand and left-hand sections being 102.69 feet and 73 feet respectively.

During the summer, when flashboards are on the dam, the Francis formula is used in computing the flow. At other times, a discharge curve, derived from Cornell University experiments, is used. Three water wheels are in use. Two are 54-inch wheels, built by the Camden Water Wheel Works, and are usually run 10 hours per day, at a nearly constant gate opening. The third is a 36-inch Helmer turbine.

Current meter measurements of the discharge of one of the 54-inch wheels, as run under light and heavy load, showed the following results:

June 2, 1900............. Discharge 43.2 second-feet.
September 6, 1900........ Discharge 51.8 second-feet.

The gauging record at McConnellsville was discontinued June 30, 1901.

The following data relative to maximum discharges of Fish Creek were obtained for the United States Board of Engineers on Deep Waterways.[a]

LOCATION.	Drainage area, square miles.	Date of flood.	ESTIMATED MAXIMUM DISCHARGE.	
			Second-feet.	Second-feet per square-mile.
Williamstown [b]	16.2		500	30.9
Williamstown [c]	16.5		561	34.0
West Camden	47.5	Spring, 1884	1,620	34.1
Camden [d]	61.4	June, 1889	1,475	24.1
Camden [e]	61.5		1,417	23.0
Camden [f]	61.5		1,456	23.5
Camden [g]	68.8		1,335	21.9
McConnellsville	187.0	——1884	6,170	32.7
Taberg Station [h]	387.0	March 14, 1898	5,875	15.2
Fish Creek[i]	533.0	March 15, 1898	7,597	14.2
Point Rock [j]	104.3	Fall, 1897	8,400	80.5

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[a] Report on Special Water Supply Investigation, Pt. 11, pp. 790–791.
[b] Upper Dam.
[c] Lower Dam
[d] Grist Mill Dam.
[e] Foundry Dam.
[f] Planing Mill Dam.
[g] Dorance's Dam.
[h] Below junction E. and W. branches
[i] Below confluence with Wood Creek.
[j] East Branch.
[k] No additional data for West Branch Fish Creek has been obtained during 1902.

A current meter measurement of East branch of Fish Creek was made at Wilson's bridge one mile above Point Rock village, May 17, 1900; the discharge was 485 second-feet.

Mean Daily Flow in Second-feet of West Branch, Fish Creek, at McConnellsville, Oneida County, N. Y.

[Drainage area, 187 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1.	.....	.....	.....	.....	.....	.....	.....	.....	.....	137	365	237
2.	.....	.....	.....	.....	.....	.....	.....	.....	.....	*50	319	245
3.	.....	.....	.....	.....	.....	.....	.....	.....	.....	111	292	217
4.	.....	.....	.....	.....	.....	.....	.....	.....	*	121	172	*195
5.	.....	.....	.....	.....	.....	.....	.....	.....	.....	130	155	182
6.	.....	.....	.....	.....	.....	.....	.....	.....	.....	137	*120	182
7.	.....	.....	.....	.....	.....	.....	.....	.....	.....	131	146	196
8.	.....	.....	.....	.....	.....	.....	.....	.....	.....	122	138	182
9.	.....	.....	.....	.....	.....	.....	.....	.....	.....	*65	135	199
10.	.....	.....	.....	.....	.....	.....	.....	.....	.....	102	557	180
11.	.....	.....	.....	.....	.....	.....	.....	.....	*	81	1,562	*140
12.	.....	.....	.....	.....	.....	.....	.....	.....	.....	87	997	199
13.	.....	.....	.....	.....	.....	.....	.....	.....	100	124	*700	186
14.	.....	.....	.....	.....	.....	.....	.....	.....	90	134	734	212
15.	.....	.....	.....	.....	.....	.....	.....	.....	96	397	434	162
16.	.....	.....	.....	.....	.....	.....	.....	.....	47	*360	514	157
17.	.....	.....	.....	.....	.....	.....	.....	.....	47	562	365	147
18.	.....	.....	.....	.....	.....	.....	.....	.....	*50	346	365	*120
19.	.....	.....	.....	.....	.....	.....	.....	.....	98	227	365	187
20.	.....	.....	.....	.....	.....	.....	.....	.....	81	190	*370	157
21.	.....	.....	.....	.....	.....	.....	.....	.....	57	172	371	190
22.	.....	.....	.....	.....	.....	.....	.....	.....	55	467	220	287
23.	.....	.....	.....	.....	.....	.....	.....	.....	57	*700	216	317
24.	.....	.....	.....	.....	.....	.....	.....	.....	332	750	300	468
25.	.....	.....	.....	.....	.....	.....	.....	.....	*360	624	329	*390
26.	.....	.....	.....	.....	.....	.....	.....	.....	197	434	319	285
27.	.....	.....	.....	.....	.....	.....	.....	.....	231	1,097	*255	285
28.	.....	.....	.....	.....	.....	.....	.....	.....	181	871	299	225
29.	.....	.....	.....	.....	.....	.....	.....	.....	181	686	251	170
30.	.....	.....	.....	.....	.....	.....	.....	.....	147	*440	172	120
31.	.....	.....	.....	.....	.....	.....	.....	.....	.....	464	.....	120
Mean	.....	.....	.....	.....	.....	.....	.....	.....	134	333	384	211
1899.												
1.	120	228	402	586	273	292	58	.....	.....	.....	.....	.....
2.	126	183	402	*520	313	307	*10	.....	.....	.....	.....	.....
3.	194	183	438	601	243	259	10	.....	.....	.....	.....	.....
4.	261	172	595	601	184	*150	10	.....	.....	.....	.....	.....
5.	321	*120	*700	601	184	159	95	.....	.....	.....	.....	.....
6.	396	212	956	591	184	134	95	.....	.....	.....	.....	.....
7.	396	156	856	689	*120	124	95	.....	.....	.....	.....	.....
8.	*285	156	700	1,557	183	114	125	.....	.....	.....	.....	.....
9.	352	147	856	*2,110	154	114	*100	.....	.....	.....	.....	.....
10.	422	136	583	1,690	154	95	77	.....	.....	.....	.....	.....
11.	502	117	546	1,724	183	*20	47	.....	.....	.....	.....	.....
12.	587	*80	*700	2,055	243	81	47	.....	.....	.....	.....	.....
13.	873	99	1,178	2,440	194	81	95	.....	.....	.....	.....	.....
14.	873	132	1,178	2,920	*120	107	47	.....	.....	.....	.....	.....
15.	*795	94	1,178	3,040	189	76	47	.....	.....	.....	.....	.....
16.	787	131	972	*2,410	189	72	*10	.....	.....	.....	.....	.....
17.	735	148	782	1,720	189	57	95	.....	.....	.....	.....	.....
18.	615	133	567	1,644	189	*20	95	.....	.....	.....	.....	.....
19.	615	*120	*485	1,434	374	102	95	.....	.....	.....	.....	.....
20.	530	183	505	1,174	374	102	58	.....	.....	.....	.....	.....
21.	495	198	433	1,085	*255	97	58	.....	.....	.....	.....	.....
22.	*360	258	442	1,045	303	65	21	.....	.....	.....	.....	.....
23.	314	338	443	*940	244	85	*10	.....	.....	.....	.....	.....
24.	425	438	442	664	194	75	47	.....	.....	.....	.....	.....
25.	350	438	442	564	189	*10	47	.....	.....	.....	.....	.....
26.	325	*360	*360	470	174	47	47	.....	.....	.....	.....	.....
27.	338	403	552	366	134	47	47	.....	.....	.....	.....	.....
28.	308	403	599	366	*50	47	47	.....	.....	.....	.....	.....
29.	*225	.....	599	364	700	97	10	.....	.....	.....	.....	.....
30.	278	.....	599	*220	455	97	*10	.....	.....	.....	.....	.....
31	278	.....	599	.....	483	.....	95	.....	.....	.....	.....	.....
Mean	435	206	648	1,206	239	101	57	.....	.....	.....	.....	.....

*Sundays.

Mean Daily Flow in Second-feet of West Branch, Fish Creek, at McConnellsville, Oneida County, N. Y.—(Concluded).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	.....	.....	.....	.....	278	96	*52	60	48	69	157	160
2	.....	.....	.....	.....	255	78	78	60	*10	54	144	*117
3	.....	.....	.....	.....	232	*28	78	60	20	49	133	144
4	.....	.....	.....	.....	243	70	52	58	50	65	*93	122
5	.....	.....	.....	.....	243	58	52	*10	50	65	132	257
6	.....	.....	.....	.....	*205	70	96	50	60	64	104	201
7	.....	.....	.....	.....	225	70	80	50	60	*34	143	169
8	.....	.....	.....	.....	165	88	*52	50	28	39	217	150
9	.....	.....	.....	.....	185	90	78	50	*10	39	180	*117
10	.....	.....	.....	.....	185	*52	78	58	50	59	163	118
11	.....	.....	.....	.....	185	78	78	50	50	55	*110	138
12	.....	.....	.....	.....	172	70	70	*30	60	54	107	127
13	.....	.....	.....	.....	*105	60	70	56	60	64	107	127
14	.....	.....	.....	.....	148	68	60	168	60	*36	132	137
15	.....	.....	.....	.....	140	78	*10	98	58	71	112	97
16	.....	.....	.....	.....	135	86	60	61	*10	76	101	*82
17	.....	.....	.....	.....	125	*52	60	64	60	76	86	121
18	.....	.....	.....	.....	120	72	70	48	60	46	*78	112
19	.....	.....	.....	.....	106	58	60	*19	55	86	144	95
20	.....	.....	.....	.....	*75	78	60	30	55	71	207	58
21	.....	.....	.....	.....	104	70	60	50	106	*60	224	50
22	.....	.....	.....	.....	104	70	*10	50	239	106	239	28
23	.....	.....	.....	.....	96	68	60	60	*128	116	246	*31
24	.....	.....	.....	.....	96	*28	50	55	87	218	231	31
25	.....	.....	.....	.....	86	70	64	30	87	148	*196	31
26	.....	.....	.....	.....	86	70	60	*19	66	134	330	31
27	.....	.....	.....	.....	*38	70	76	60	66	140	355	51
28	.....	.....	.....	.....	82	70	26	134	66	*128	223	51
29	.....	.....	.....	.....	71	70	*36	76	50	150	187	31
30	.....	.....	.....	.....	52	68	60	50	*58	150	179	*31
31	.....	.....	.....	.....	88	.....	60	50	.....	206	.....	58
Mean	.....	.....	.....	.....	143	68	60	57	65	88	168	99
1901												
1	150	135	95	620	170	478	.....	.....	.....	.....	.....	.....
2	150	135	85	545	170	*540	.....	.....	.....	.....	.....	.....
3	150	*100	*50	915	140	510	.....	.....	.....	.....	.....	.....
4	115	135	85	1,420	140	440	.....	.....	.....	.....	.....	.....
5	115	110	38	1,520	*120	355	.....	.....	.....	.....	.....	.....
6	*100	130	85	1,210	110	690	.....	.....	.....	.....	.....	.....
7	111	110	85	*1,070	110	710	.....	.....	.....	.....	.....	.....
8	111	110	88	1,165	95	878	.....	.....	.....	.....	.....	.....
9	111	110	75	1,060	90	*690	.....	.....	.....	.....	.....	.....
10	116	*65	*45	980	90	630	.....	.....	.....	.....	.....	.....
11	111	110	115	695	340	570	.....	.....	.....	.....	.....	.....
12	111	61	150	620	*460	520	.....	.....	.....	.....	.....	.....
13	*100	95	170	630	345	470	.....	.....	.....	.....	.....	.....
14	130	95	190	*620	220	375	.....	.....	.....	.....	.....	.....
15	125	95	250	540	170	368	.....	.....	.....	.....	.....	.....
16	121	95	250	470	120	*335	.....	.....	.....	.....	.....	.....
17	121	*80	*230	425	120	360	.....	.....	.....	.....	.....	.....
18	111	85	290	420	126	320	.....	.....	.....	.....	.....	.....
19	106	100	290	390	*100	310	.....	.....	.....	.....	.....	.....
20	*110	100	344	358	130	310	.....	.....	.....	.....	.....	.....
21	136	100	580	*560	130	1,060	.....	.....	.....	.....	.....	.....
22	146	90	815	670	150	833	.....	.....	.....	.....	.....	.....
23	136	90	730	655	180	*620	.....	.....	.....	.....	.....	.....
24	111	*65	*730	530	185	440	.....	.....	.....	.....	.....	.....
25	111	90	1,050	460	293	310	.....	.....	.....	.....	.....	.....
26	111	80	3,020	315	*200	200	.....	.....	.....	.....	.....	.....
27	*100	90	4,410	258	230	170	.....	.....	.....	.....	.....	.....
28	111	90	2,180	*230	220	170	.....	.....	.....	.....	.....	.....
29	125	.....	1,165	235	230	118	.....	.....	.....	.....	.....	.....
30	125	.....	960	170	355	*100	.....	.....	.....	.....	.....	.....
31	105	.....	*730	.....	420	.....	.....	.....	.....	.....	.....	.....
Mean	119	97	625	657	192	643	.....	.....	.....	.....	.....	.....

*Sundays.

Principal Developed Water Powers on West Branch, Fish Creek.

No. of dam.	LOCATION OF DAM.	No. of mills at dam.	Effective head-Feet.	Rated H. P. of water wheels.	Number of employees.	Use made of power.
1	Taberg	1	8	......	......	Saw mill.
2	McConnellsville	2	6	111	40	Wood working.
3	Camden	4	7-9	114	22	Wood working.
4	Camden	2	9-10	136	220	Foundry and knitting mill.
5	Camden	1	10	157	2	Grist mill.
6	Camden	1	5	53	2	Saw and grist mill.
7	West Camden	2	5	92	21	Chair factory.
8	Williamstown	2	16	66	5	Saw and grist mill.
9	Williamstown	1	9	185	4	Grist mill.

Mean Monthly Run-off of West Branch of Fish Creek at McConnellsville, Oneida County, N. Y.

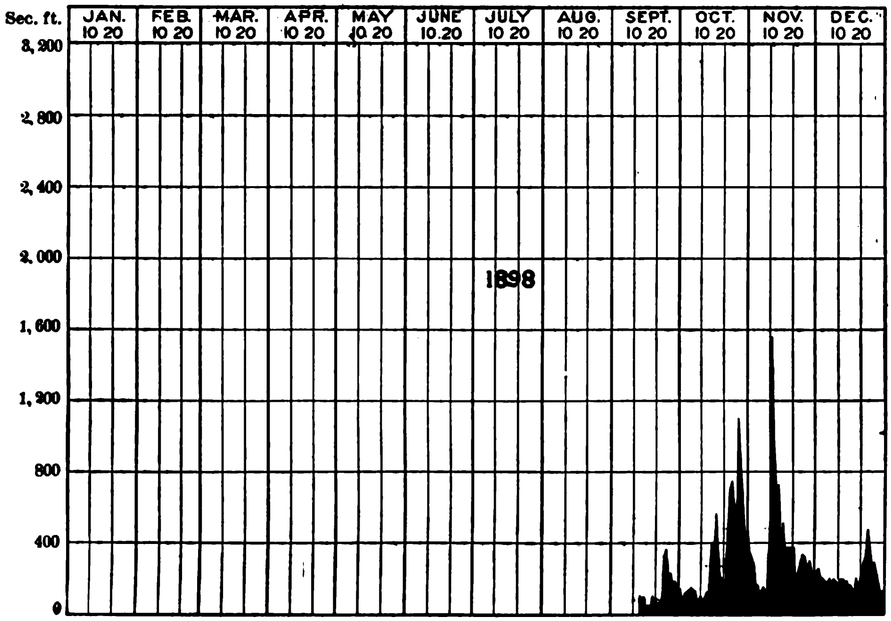
[Drainage area 187 square miles.]

MEAN MONTHLY FLOW IN SECOND-FEET.

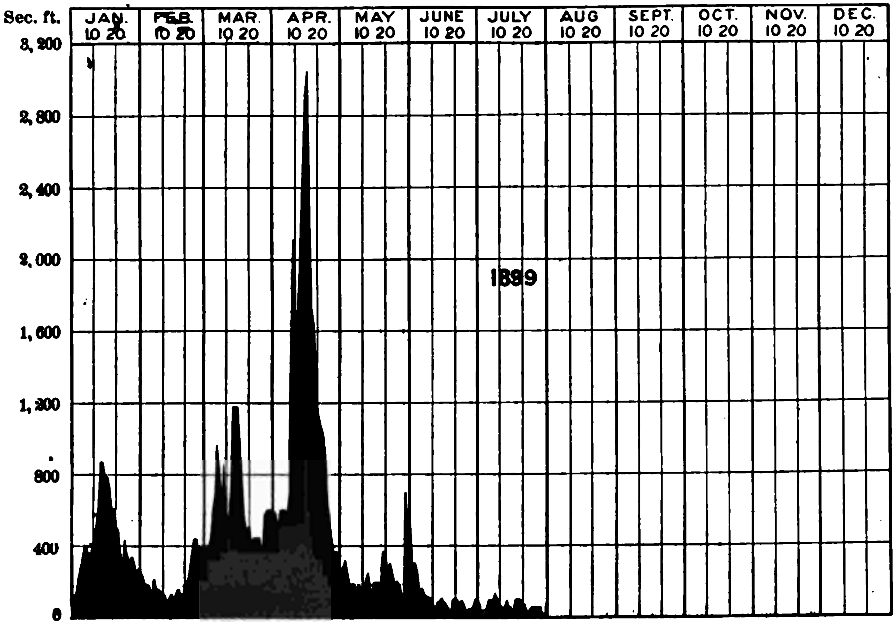
MONTH.	1898.	1899.	1900.	1901.
January	....	435	....	119
February	....	206	....	97
March	....	648	....	625
April	....	1,206	....	657
May	....	239	143	192
June	....	101	68	463
July	....	57	60	....
August	....	....	57	....
September	134	....	65	....
October	333	....	88	....
November	388	....	168	....
December	211	....	99	....

SECOND-FEET PER SQUARE MILE.

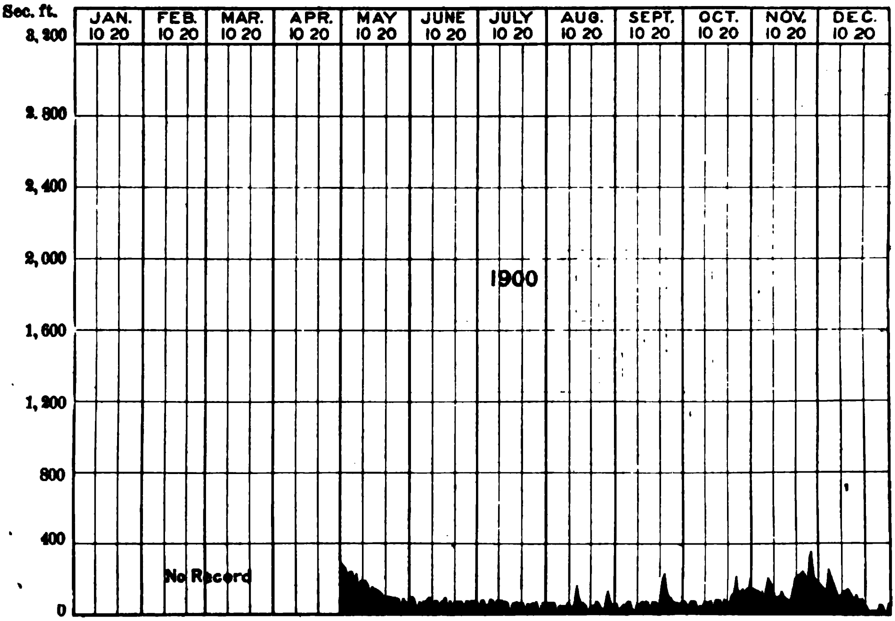
MONTH.	1898.	1899.	1900.	1901.
January	....	2.33	....	0.64
February	....	1.10	....	0.52
March	....	3.47	....	3.34
April	....	6.46	....	3.51
May	....	1.28	0.76	1.03
June	....	0.54	6.36	2.48
July	....	0.30	0.32	....
August	....	....	0.30	....
September	0.72	....	0.34	....
October	1.78	....	0.42	....
November	2.06	....	0.90	....
December	1.13	....	0.53	....



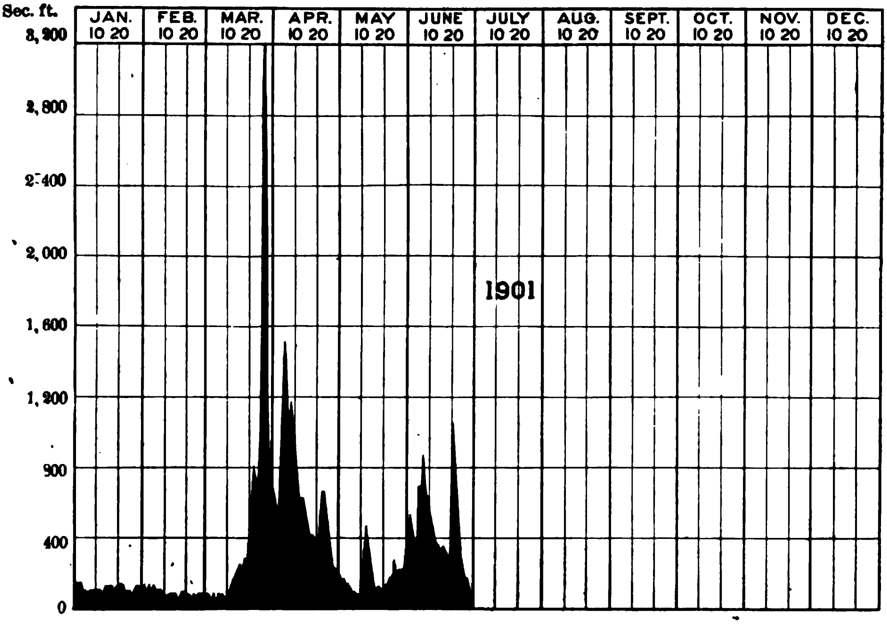
Discharge of West Branch of Fish Creek at McConnellsville, Oneida County, N. Y., 1898.



Discharge of West Branch of Fish Creek at McConnellsville, Oneida County, N. Y., 1899.



Discharge of West Branch of Fish Creek at McConnellsville, Oneida County, N. Y., 1900.



Discharge of West Branch of Fish Creek at McConnellsville, Oneida County, N. Y., 1901.

Mean Monthly Run-off of West Branch of Fish Creek at McConnellsville, Oneida County, N. Y. —(Concluded).

INCHES ON DRAINAGE AREA.

MONTH.	1898.	1899.	1900.	1901.
January	....	2.68	....	0.74
February	....	1.14	....	0.54
March	....	4.00	....	3.84
April	....	7.20	....	8.93
May	....	1.47	0.87	1.18
June	....	0.60	0.40	2.78
July	....	0.34	0.37	....
August	....	....	0.34	....
September	0.80	....	0.38	....
October	2.07	....	0.48	....
November	2.30	....	1.01	....
December	1.30	....	0.62	....

ONEIDA CREEK AT KENWOOD, MADISON COUNTY, N. Y.[a]

This stream rises in Madison county and flows in a northwesterly direction, crossing the Erie Canal and emptying into Oneida Lake at its southeastern extremity. It is shown on the Oneida atlas sheet of the United States Geological Survey. The station is located at the dam of Oneida Community at Kenwood, which is of framed timber, having a level crest 79.4 feet in length.

Water is conducted to the mill in an open earth canal, terminating near the silk mill. A short, circular wooden flume conducts water from the headrace to the 24-inch Hercules turbine, which is ordinarily run at one-third gate. There is no leakage of the dam, and only a slight leakage of flume and headgates. This has been taken at two second-feet. The flow over a wasteway near the mill is computed by means of the Francis formula. A discharge curve for a second spillway has been prepared, using coefficients from the Cornell experiments for dam with a broad, flat crest.[b]

Current meter measurements, to check the calculated flow at Kenwood, have been made with results as follows:

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[a] See Water Supply and Irrigation Paper, U. S. G. S., No. 36, p. 186.
[b] See Trans. Am. Soc. C. E., Vol. XLIV, p. 277.

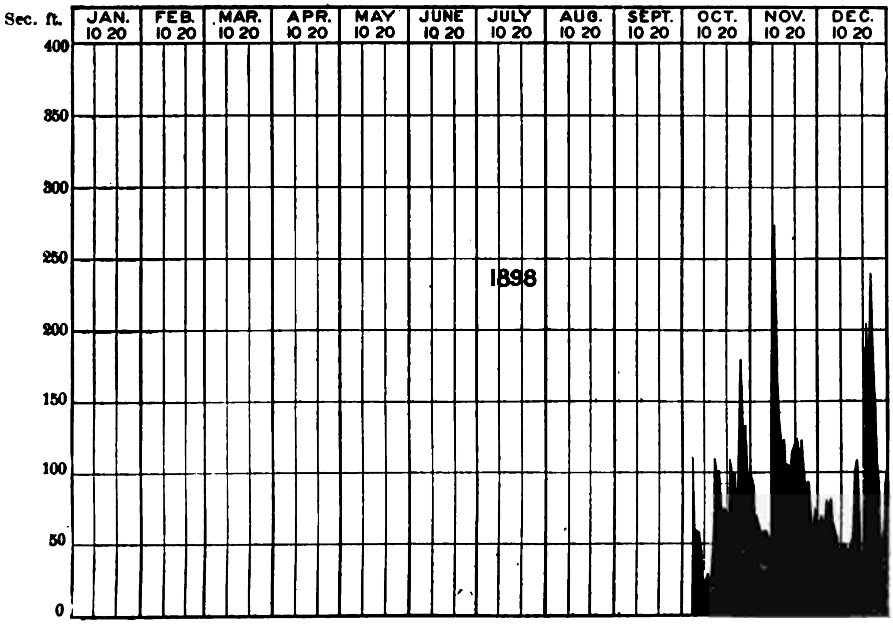
June 1, 1900; total flow at Oneida Castle	**36.6**
Flow over dam, crest gauge reading, 0.15	**19**
Flow through turbine, 11.75 head, one-third gate	**15**
Flow over wasteway near mill	**1**
Assumed leakage	**2**
Computed total flow	**37**
September 17, 1900; total flow measured in headrace	**20**
Flow through turbine, one-third gate	**15**
Assumed leakage	**2**
Total flow computed	**17**

At Oneida is a State dam diverting water for the supply of the summit level of Erie Canal. No measurements of diversion to the feeder have been made. Practically the entire flow of Oneida Creek, less leakage of the dam, is taken for this purpose during the low water season.

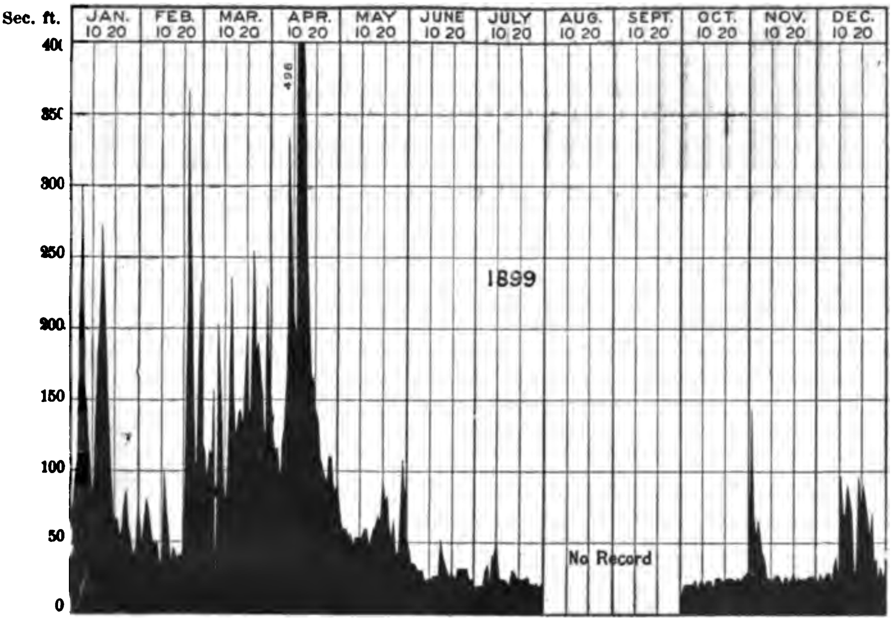
The highest recorded freshet on Oneida Creek occurred in 1892. The calculated discharge over Kenwood dam was 3,292 second-feet or 41.2 second-feet per square mile. December 15, 1901, a sudden freshet, resulting from excessive rainfall on frozen ground, produced a discharge estimated at 2,075 second-feet or 35.1 second-feet per square mile from the tributary drainage area of 59 square miles.

Mean Monthly Run-off of Oneida Creek at Kenwood, Madison County, N. Y.
[Drainage area 59 square miles.]

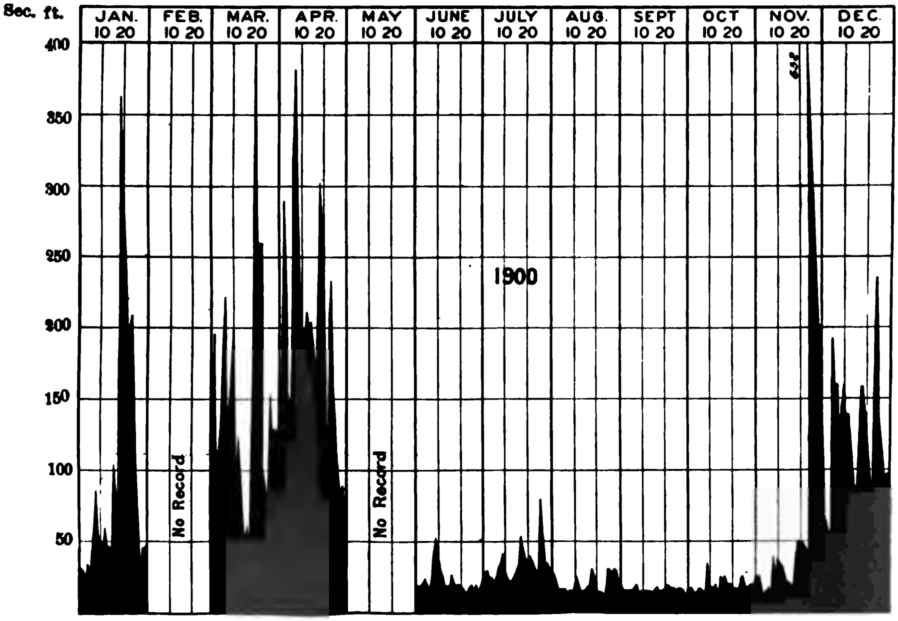
MONTH.	SECOND-FEET.			SECOND-FEET PER SQUARE MILE.			INCHES ON DRAINAGE AREA.		
	1898.	1899.	1900.	1898.	1899.	1900.	1898.	1899.	1900.
January	......	117	92	......	1.98	1.56	......	2.28	1.80
February	......	93	......	......	1.58	......	......	1.64	......
March	......	157	148	......	2.66	2.51	......	3.06	2.89
April	......	183	198	......	3.10	3.35	......	3.46	3.74
May	......	62	......	......	1.05	......	......	1.21	......
June	......	30	21	......	0.51	0.35	......	0.57	0.39
July	....	25	38	......	0.42	0.64	......	0.48	0.74
August	......	......	19	......	......	0.32	......	......	0.37
September	......	......	16	......	......	0.27	......	......	0.30
October	83	23	19	1.40	0.39	0.32	1.61	0.45	0.37
November	105	33	91	1.78	0.56	1.54	1.98	0.62	1.72
December	90	60	127	1.52	1.02	2.15	1.75	1.17	2.47



Discharge of Oneida Creek at Kenwood, Madison County, N. Y., 1898.



Discharge of Oneida Creek at Kenwood, Madison County, N. Y., 1899.



Discharge of Oneida Creek at Kenwood, Madison County, N. Y., 1900.

The drainage area tributary to Oneida Creek above its mouth is 149 square miles.[c]

Mean Daily flow in Second-feet of Oneida Creek at Kenwood, Madison County, N. Y.

[Drainage area 59 square miles.]

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1											90	70
2										*	72	63
3											70	80
4											65	*76
5										112	60	82
6										58	*58	65
7										60	60	60
8										58	58	55
9										*45	51	45
10										23	265	50
11										23	274	*50
12										30	172	50
13										27	*140	45
14										51	119	50
15										110	123	55
16										*100	106	101
17										102	106	108
18										75	102	*69
19										75	115	40
20										75	*121	60
21										70	123	205
22										110	109	170
23										*100	123	240
24										100	100	173
25										75	86	*136
26										120	93	100
27										180	*77	80
28										129	61	50
29										133	76	70
30										*100	64	101
31										100		101
Mean										83	105	90
1899.												
1	*76	50	115	122	71	46	18			*15	144	23
2	96	65	96	*115	60	36	*20			21	69	29
3	108	80	115	116	60	36	20			21	56	*25
4	210	72	112	96	59	*35	20			21	66	27
5	300	*59	*157	122	54	31	30			21	*55	29
6	160	50	22	131	55	31	34			21	44	29
7	143	50	202	166	*48	31	21			24	40	25
8	*114	50	168	334	53	24	41			*18	26	33
9	95	35	128	*260	53	24	*40			24	26	41
10	80	37	75	214	53	24	51			24	24	*25
11	138	100	90	196	54	*25	26			21	26	97
12	180	*74	*149	496	59	26	24			24	*27	70
13	205	56	235	416	59	26	24			24	28	70
14	273	37	157	406	*48	26	24			24	26	91
15	*225	47	123	341	53	51	21			*19	22	82
16	183	42	140	*260	60	41	*20			25	26	73
17	135	39	144	196	61	36	31			25	26	*30
18	101	41	133	166	68	*30	28			25	22	30
19	75	*40	*157	166	66	26	26			24	*25	97
20	65	52	198	144	91	31	26			24	28	79
21	67	160	135	136	*80	26	24			25	24	92
22	*57	365	157	110	82	26	25			*25	26	80
23	55	232	254	*102	63	31	*25			25	24	68
24	75	147	183	96	54	31	26			25	26	*55
25	85	99	190	91	66	*31	21			24	24	70
26	60	*161	*170	110	43	31	21			25	*25	36
27	55	232	157	110	43	31	20			24	26	39
28	42	122	123	91	*71	24	21			25	26	27
29	*43		230	86	108	24	18			*26	26	34
30	51		183	*93	76	21	*20			29	26	27
31	75		165		59		21			31		*34
Mean	117	93	157	183	62	30	25			23	33	60

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[c] No additional data obtained during 1902.

*Sunday.

Mean Daily Flow in Second-feet of Oneida Creek at Kenwood, Madison County, N. Y.—(Concluded).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	.....	.....	98	*	.....	19	*	27	15	17	26	71
2	29	.....	194	290	.....	18	29	22	*	17	26	*63
3	26	.....	99	208	.....	*	25	16	15	14	16	55
4	34	.....	*	154	.....	23	.....	16	15	14	*16	126
5	29	.....	135	149	.....	20	22	*	15	17	16	193
6	40	.....	191	313	.....	17	25	16	16	17	18	160
7	*	.....	223	382	.....	23	32	13	19	*	16	160
8	86	.....	140	*	.....	43	*	15	14	14	40	138
9	54	.....	150	220	.....	52	42	14	*	35	32	*149
10	51	.....	199	200	.....	*	31	.....	15	18	37	160
11	47	.....	*	196	.....	30	24	25	15	17	*35	138
12	60	.....	98	212	.....	23	22	*	15	17	33	108
13	47	.....	124	201	.....	17	22	14	15	19	26	108
14	*	.....	100	204	.....	17	25	15	14	*13	22	88
15	45	.....	67	*	.....	17	*	16	14	25	22	88
16	104	.....	52	172	.....	27	31	18	*	23	19	*123
17	81	.....	62	218	.....	*	54	20	17	25	22	158
18	76	.....	*48	302	.....	17	46	32	15	19	*30	160
19	364	.....	148	268	.....	19	38	*	15	19	37	138
20	304	.....	394	224	.....	17	34	17	13	19	50	138
21	*	.....	262	177	.....	17	40	14	19	*17	50	108
22	196	.....	259	*	.....	14	*	14	19	17	50	88
23	89	.....	259	234	.....	14	34	13	*	17	46	*162
24	209	.....	102	160	.....	*	28	13	17	23	43	237
25	161	.....	*	134	.....	19	27	32	17	25	*337	176
26	101	.....	82	102	.....	16	80	*	15	19	632	132
27	.....	.....	154	85	.....	19	55	28	17	17	353	126
28	*30	.....	128	88	.....	14	36	31	17	*	282	108
29	46	.....	128	*	.....	19	*	28	15	19	225	96
30	45	.....	128	61	.....	26	31	20	*11	19	168	*97
31	47	.....	118	.....	.....	.....	28	19	.....	23	.....	98
Mean	92	.....	148	198	.....	21	38	19	16	19	91	127

*Sunday.

CHITTENANGO CREEK AT BRIDGEPORT, MADISON COUNTY, N. Y.

This creek rises in southwestern Madison county, flows in a northwesterly direction between Madison and Onondaga counties into Oneida Lake, the outlet of which is Oneida River, a tributary of Oswego River. The drainage basin of the stream is shown on Chittenango sheet of the United States Geological Survey. Observations for the computation of flow of this creek are made at the mill dam in Bridgeport, a short distance above its mouth. Gauge readings are taken three times a day, showing the height of the water above the crest of the dam, head on water wheels and widths of gate openings. The dam is of timber, backed with stone, and has a nearly level crest 215 feet in length, with flood gates at each end.

The current meter measurement was made at a highway bridge below the inflow of Butternut Creek, near Bridgeport, on June 16, 1900. The total flow of Chittenango Creek at that point was found to be 95 second-feet. The stage of the stream, as shown by the record kept at Bridgeport, was uniform for several days. The mean flow, as computed from the gauge readings, was 95 second-feet for June 15 and 16. There is no opportunity for separately measuring the discharge through the turbines, or leakage of the dam at this station, and an allowance of 15 second-feet for leakage of the dam, and of the dike leading to the old saw mill, has been made.

The saw mill, situated on the left side of the stream, runs very irregularly. The water wheels are old, and the penstocks leak badly. A current meter measurement was made in the head-race leading to the saw mill on June 16. The water wheels were running, and the flow was found to be 14.4 second-feet.

The relatively low run-off from the watershed of Chittenango Creek, during the summer months, as shown in the accompanying tables, may be attributed to diversion of a portion of the flow to supply the summit level of the Erie Canal.

State dams are situated on the main stream at Chittenango, and on its two tributaries, Limestone Creek and Butternut Creek. Cazenovia Lake, Erieville, DeRuyter, and Jamesville reservoirs impound storage by which the flow is regulated to some extent.

The first two reservoirs are described in connection with the Chittenango meter station.[a]

De Ruyter reservoir, situated near Delphi, has a capacity of 504,468,000 cubic feet, and a water surface area of 626 acres. It receives storage from 18.5 square miles of area naturally tributary to Tioughnioga River, a tributary of Chenango River. The outflow from this reservoir is diverted into Limestone Creek and enters Erie Canal through the Fayetteville feeder.

The Jamesville reservoir is situated on the headwaters of Butternut Creek, which is tributary to Chittenango Creek through Limestone Creek. The reservoir has a storage capacity of 170,000,000 cubic feet, and a water surface area of 252 acres. It receives drainage from 46.2 square miles of watershed. The outflow is turned into Erie Canal through the Orville feeder.

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[a] See page 58.

Owing to its location below three feeders of the canal, the records at Bridgeport do not show the actual run-off of the watershed during the canal season. During the winter some water, draining into the summit level of the canal, is drawn off into Chittenango Creek at the aqueducts crossing the main stream and its tributaries. Owing to uncertainty in the run-off of the watershed, derived from this record, the Bridgeport station was abandoned May 31, 1901, and a current meter station established, in its stead, above the State dam at Chittenango.

Mean Daily Flow in Second-feet, Chittenango Creek at Bridgeport, Madison County, N. Y.

[Drainage area, 307 square miles.]

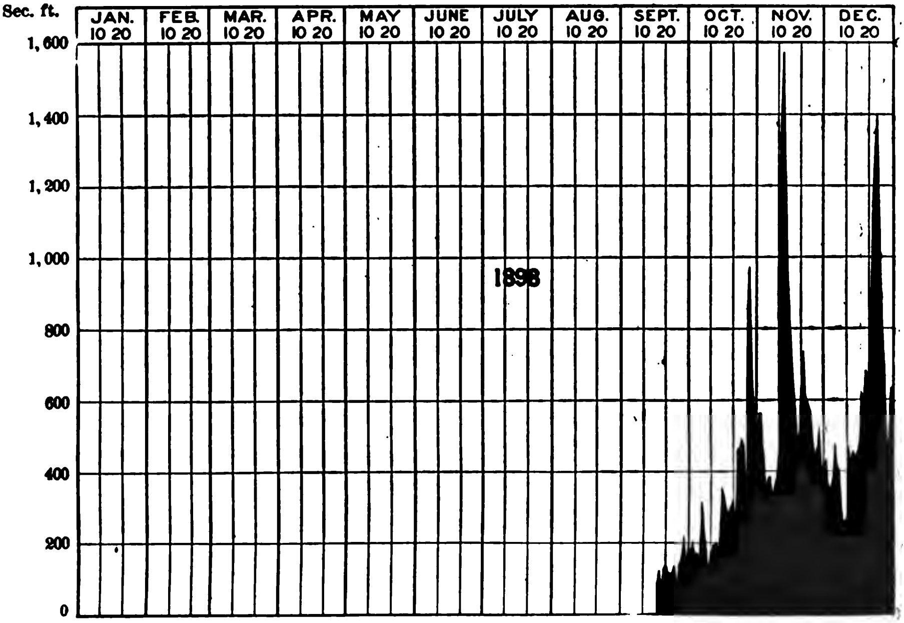
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	......	......	......	......	......	......	......	......	......	180	562	427
2	......	......	......	......	......	......	......	......	......	*205	559	360
3	......	......	......	......	......	......	......	......	......	171	434	348
4	......	......	......	......	......	......	......	......	......	172	358	*385
5	......	......	......	......	......	......	......	......	......	156	379	471
6	......	......	......	......	......	......	......	......	......	309	*385	414
7	......	......	......	......	......	......	......	......	......	235	331	404
8	......	......	......	......	......	......	......	......	......	204	359	320
9	......	......	......	......	......	......	......	......	......	*130	386	261
10	......	......	......	......	......	......	......	......	......	165	474	265
11	......	......	......	......	......	......	......	......	......	194	1,339	*465
12	......	......	......	......	......	......	......	......	......	196	1,571	434
13	......	......	......	......	......	......	......	......	......	197	*1,265	454
14	......	......	......	......	......	......	......	......	......	181	921	442
15	......	......	......	......	......	......	......	......	......	354	790	450
16	......	......	......	......	......	......	......	......	82	*335	694	472
17	......	......	......	......	......	......	......	......	116	299	615	619
18	......	......	......	......	......	......	......	......	*53	284	500	*605
19	......	......	......	......	......	......	......	......	119	297	506	678
20	......	......	......	......	......	......	......	......	139	320	*675	669
21	......	......	......	......	......	......	......	......	117	269	728	793
22	......	......	......	......	......	......	......	......	111	463	623	1,155
23	......	......	......	......	......	......	......	......	115	*465	593	1,293
24	......	......	......	......	......	......	......	......	135	487	569	1,401
25	......	......	......	......	......	......	......	......	*85	472	490	*1,075
26	......	......	......	......	......	......	......	......	142	352	442	857
27	......	......	......	......	......	......	......	......	149	867	*465	726
28	......	......	......	......	......	......	......	......	214	972	523	541
29	......	......	......	......	......	......	......	......	154	661	413	480
30	......	......	......	......	......	......	......	......	198	*565	421	630
31	......	......	......	......	......	......	......	......	......	519	......	630
Mean	......	......	......	......	......	......	......	......	129	344	612	597
1899.												
1	*515	520	632	837	447	426	116	84	81	*75	60	113
2	571	484	473	*795	357	346	*55	79	49	90	145	127
3	636	440	385	752	310	234	97	169	*45	91	145	*143
4	737	465	520	861	172	*105	113	126	133	90	160	159
5	1,067	*385	*1,260	866	172	184	132	134	81	80	*165	149
6	1,310	356	1,331	864	157	229	99	*70	76	141	228	151
7	1,282	342	1,475	857	*95	229	123	125	74	89	128	166
8	*1,135	465	1,069	1,420	172	244	132	125	96	*45	120	179
9	724	385	860	*1,675	172	192	*45	134	96	107	108	155
10	486	385	852	1,369	227	147	89	79	*15	117	65	*168
11	473	385	659	1,306	237	*70	262	62	71	101	46	181
12	623	*385	*565	1,274	172	169	271	44	96	101	*35	211
13	849	538	1,196	1,597	172	192	162	*15	92	85	72	326
14	*738	524	1,061	1,737	*165	182	169	141	56	72	57	395
15	1,260	462	970	1,614	180	109	99	125	88	*15	65	395
16	1,280	362	665	*1,405	174	184	*70	103	79	84	60	374
17	1,101	449	634	1,339	250	192	101	87	*25	30	88	*355
18	632	354	526	1,221	310	*70	221	76	89	38	57	466
19	390	*385	*565	859	374	152	210	91	74	38	*25	706
20	395	541	736	861	374	84	204	*25	96	45	83	588
21	389	444	766	629	*385	92	152	120	117	47	70	298
22	*385	619	962	447	281	100	117	109	39	*15	78	304
23	399	950	1,061	*165	265	124	*70	96	84	60	100	254
24	372	1,074	1,345	627	252	134	102	(*a*)	*25	68	102	*200
25	311	1,314	1,061	527	197	*70	102	......	67	43	110	139
26	362	*1,015	*885	456	195	141	122	......	49	57	*25	238
27	308	645	626	331	227	109	110	*	112	48	109	261
28	332	755	760	279	*225	109	88	......	119	25	133	201
29	*385	......	1,075	359	312	84	109	56	96	*20	114	249
30	448	......	1,360	*295	333	91	*45	96	79	65	105	244
31	637	......	1,360	......	229	......	141	112	......	65	......	*240
Mean	662	551	893	921	245	161	127	96	76	64	95	281

*Sundays.

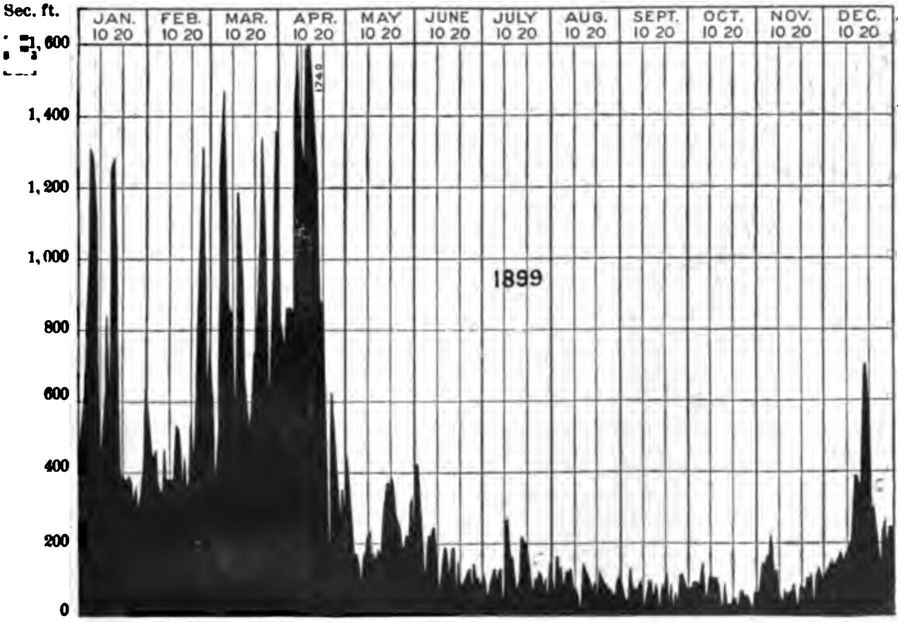
Mean Daily Flow in Second-feet, Chittenango Creek at Bridgeport, Madison County, N. Y.—(Continued).

DAY	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	161	467	774	*1,290	266	106	*38	107	91	67	106	*678
2	247	581	671	1,394	266	80	91	108	*53	108	100	355
3	242	581	605	1,447	245	*70	99	68	75	67	82	359
4	263	*595	*595	1,447	245	134	33	80	79	75	*34	288
5	318	580	792	1,342	237	125	82	*38	55	75	67	865
6	379	607	776	1,327	*215	132	153	103	67	91	70	1,330
7	*275	602	892	1,318	295	117	132	40	55	*38	73	1,150
8	374	1,437	591	*1,365	287	88	*130	40	33	100	105	*1,035
9	292	969	583	1,433	295	105	156	49	*33	102	130	690
10	307	1,313	511	1,256	245	*70	77	73	87	114	86	400
11	307	*1,115	*425	1,072	237	116	88	65	60	115	*34	330
12	302	771	463	853	218	108	63	*37	72	136	102	335
13	373	1,187	441	667	*165	67	66	38	37	72	87	482
14	*275	1,700	383	675	247	96	80	120	57	*42	106	455
15	373	1,445	367	*595	259	95	*42	89	65	98	98	*457
16	422	1,188	383	544	283	95	76	92	*15	94	106	428
17	604	985	376	667	208	*70	160	83	70	89	105	496
18	609	*275	*355	620	280	117	136	96	62	63	*45	530
19	971	187	603	1,703	237	73	101	*53	53	77	153	421
20	1,540	189	589	801	*215	107	136	63	111	57	169	423
21	*1,485	242	603	880	222	92	134	83	70	*42	136	431
22	1,445	987	788	*785	166	69	*105	66	117	86	139	*358
23	1,195	992	782	860	171	78	129	124	*53	58	111	378
24	1,074	1,005	1,003	770	136	*43	100	44	79	100	113	844
25	422	*790	*1,115	577	118	116	101	92	62	96	*45	1,231
26	420	706	788	436	98	81	252	*38	84	94	1,255	452
27	784	591	707	355	*40	73	172	75	99	75	1,953	606
28	*700	591	982	268	150	78	117	95	117	*33	1,835	618
29	622	.....	1,090	*275	92	133	*105	86	108	75	1,272	*442
30	372	.....	1,221	370	117	71	124	70	*33	90	1,105	275
31	372	.....	1,351	.....	90	.....	133	66	.....	85	.....	347
Mean	561	725	607	911	207	93	110	73	68	81	327	562
1901.												
1	378	210	215	751	360	.....	.....	.....	.....	.....	.....	.....
2	363	255	280	715	323	.....	.....	.....	.....	.....	.....	.....
3	308	*275	*275	920	290	.....	.....	.....	.....	.....	.....	.....
4	303	324	330	1,375	238	.....	.....	.....	.....	.....	.....	.....
5	163	330	296	1,388	*160	.....	.....	.....	.....	.....	.....	.....
6	*160	264	195.5	1,426	123	.....	.....	.....	.....	.....	.....	.....
7	250	272	170	*1,365	143	.....	.....	.....	.....	.....	.....	.....
8	306	310	150	1,538	160	.....	.....	.....	.....	.....	.....	.....
9	307	330	210	2,030	158	.....	.....	.....	.....	.....	.....	.....
10	320	*355	*[illegible]	1,825	228	.....	.....	.....	.....	.....	.....	.....
11	407	325	510	1,541	335	.....	.....	.....	.....	.....	.....	.....
12	502	275	807	1,510	*275	.....	.....	.....	.....	.....	.....	.....
13	*425	250	1,[illegible]	1,350	425	.....	.....	.....	.....	.....	.....	.....
14	424.5	182	1,144	*1,245	381	.....	.....	.....	.....	.....	.....	.....
15	445.5	191	1,116	1,348	246	.....	.....	.....	.....	.....	.....	.....
16	431	203	1,080	1,280	246	.....	.....	.....	.....	.....	.....	.....
17	302.5	*220	*680	1,198	222.5	.....	.....	.....	.....	.....	.....	.....
18	314	285	[illegible]	892	284	.....	.....	.....	.....	.....	.....	.....
19	413	298	[illegible]	883	*[illegible]	.....	.....	.....	.....	.....	.....	.....
20	*335	195	[illegible]	858	291	.....	.....	.....	.....	.....	.....	.....
21	317	212	[illegible]	*855	251	.....	.....	.....	.....	.....	.....	.....
22	383	163	[illegible]	1,[illegible]	288	.....	.....	.....	.....	.....	.....	.....
23	382	157	[illegible]	[illegible]	312	.....	.....	.....	.....	.....	.....	.....
24	[illegible]	*[illegible]	*[illegible]	[illegible]	[illegible]	.....	.....	.....	.....	.....	.....	.....
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.....	.....	.....	.....	.....	.....	.....
26	[illegible]	[illegible]	[illegible]	[illegible]	*[illegible]	.....	.....	.....	.....	.....	.....	.....
27	*[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.....	.....	.....	.....	.....	.....	.....
28	[illegible]	[illegible]	[illegible]	*[illegible]	[illegible]	.....	.....	.....	.....	.....	.....	.....
29	[illegible]		[illegible]	[illegible]	[illegible]	.....	.....	.....	.....	.....	.....	.....
30	[illegible]		[illegible]	[illegible]	[illegible]	.....	.....	.....	.....	.....	.....	.....
31	[illegible]		*[illegible]		[illegible]	.....	.....	.....	.....	.....	.....	.....
Mean	[illegible]	[illegible]	[illegible]	1,[illegible]	[illegible]							

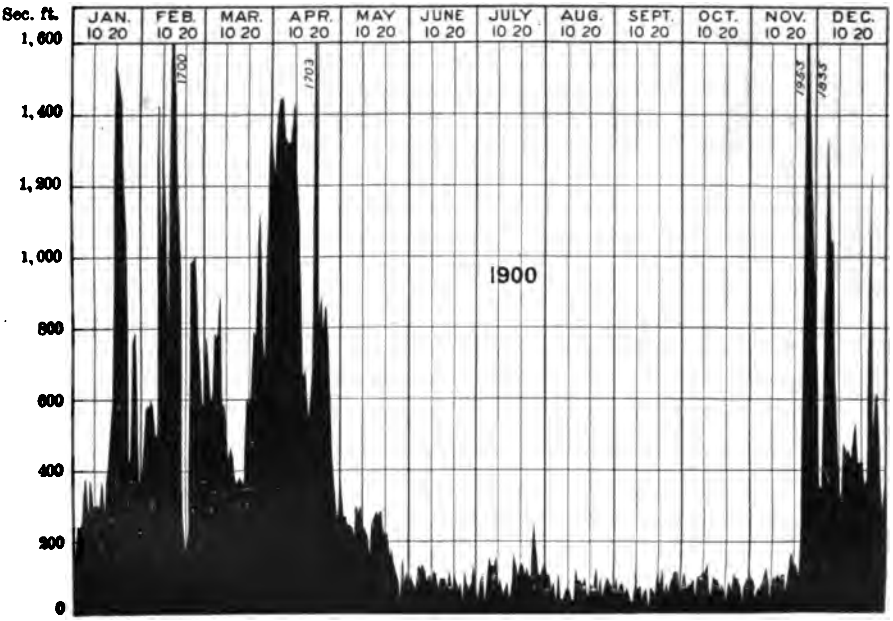
* Sundays.



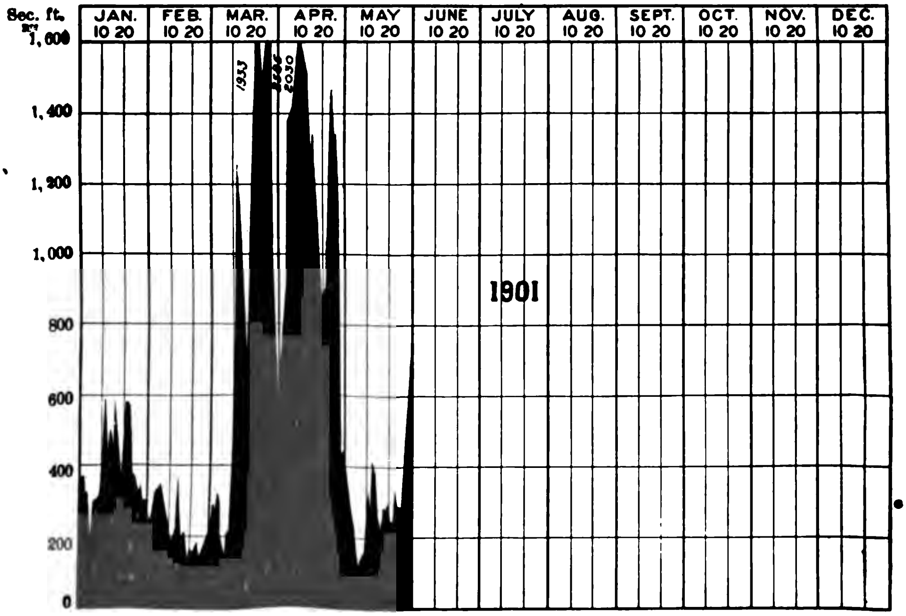
Discharge of Chittenango Creek at Bridgeport, Madison County, N. Y., 1898.



Discharge of Chittenango Creek at Bridgeport, Madison County, N. Y., 1899.



Discharge of Chittenango Creek at Bridgeport, Madison County, N. Y., 1900.



Discharge of Chittenango Creek at Bridgeport, Madison County, N. Y., 1901.

Mean Monthly Run-off of Chittenango Creek, at Bridgeport, Madison County, N. Y.

[Drainage area, 307 square miles.]

MEAN MONTHLY FLOW IN SECOND-FEET.

MONTH.	1898.	1899.	1900.	1901.
January	......	662	561	391
February	......	551	725	236
March	......	893	697	955
April	......	921	911	1,174
May	......	245	207	308
June	......	161	93	....
July	......	127	110	....
August	......	96	73	....
September	129	76	68	....
October	344	64	81	....
November	612	95	327	....
December	597	281	562	....

SECOND-FEET PER SQUARE MILE.

MONTH.	1898.	1899.	1900.	1901.
January	......	2.15	1.80	1.27
February	......	1.80	2.36	0.77
March	......	2.90	2.27	3.12
April	......	3.00	2.97	3.83
May	......	0.80	0.67	1.00
June	......	0.52	0.30	....
July	......	0.40	0.36	....
August	......	0.31	0.24	....
September	0.42	0.25	0.22	....
October	1.12	0.20	0.26	....
November	2.00	0.30	1.07	....
December	1.94	0.91	1.83	....

INCHES ON DRAINAGE AREA.

MONTH.	1898.	1890.	1900.	1901.
January	......	2.49	2.07	1.46
February	......	1.87	2.45	0.80
March	......	3.34	2.61	3.59
April	......	3.34	3.31	4.29
May	......	0.92	0.77	1.15
June	......	0.58	0.33	....
July	......	0.46	0.40	....
August	......	0.35	0.27	....
September	0.47	0.28	0.24	....
October	1.29	0.23	0.30	....
November	2.24	0.34	1.20	....
December	2.23	1.05	2.10	....

CHITTENANGO CREEK AT CHITTENANGO, MADISON COUNTY, N. Y.

A current meter gauging station was established at Main street highway bridge in Chittenango village, May 22, 1901. The stream at this point is entrained between parallel walls, affording a channel 50 feet wide, over which the bridge passes in a single span. The bridge stands at an angle of 60° to the thread of the stream, and has a span between abutments of

57 feet. The gauge board is secured in a vertical position to the right abutment on the upstream side, and reads decimally from zero to 8 feet. The stage of the stream is observed twice daily by the gauge reader, Frank A. Sutter. The bench mark is on the upstream corner of the coping of the right-hand bridge abutment.

Elevation bench mark	100.00
Elevation gauge zero	91.77

Current Meter Discharge Measurements of Chittenango Creek at Chittenango, N. Y.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1901.			
August 28	1.78	45	R. E. Horton.
August 28	1.78	48	R. E. Horton.
July 15	1.80	58	E. C. Murphy.
May 22	2.03	102	R. E. Horton.
June 5	2.3	138	J. D. Luther.
May 31	2.59	253	J. D. Luther.

The location of the Chittenango station is shown on the Chittenango quadrangle of the Topographic atlas of the Geological Survey. The gauging station is one-half mile above the State dam, diverting water for the supply of the summit level of the Erie Canal. The records kept show the amount of water supply available for canal purposes. The gauging station at Bridgeport[a] is located below this feeder. The records for the two stations are not comparable during the season of canal navigation.

The flow of the Chittenango Creek above Chittenango is regulated by storage in Cazenovia Lake and Erieville reservoir.[b]

Erieville Reservoir.

Tributary watershed	5.4	square miles.
Storage capacity	318,424,000	cubic feet.
Water surface	340	acres.

Cazenovia Lake.

Tributary watershed	8.7	square miles.
Storage capacity	206,997,000	cubic feet.
Water surface	1.7	square miles.

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[a] Described on page 53.

[b] Report on New York State Barge Canal Survey, p. 663

From Chittenango Falls to Chittenango village, a distance of five miles, the stream falls from elevation 860 feet above tide to elevation 420. From the foot of Chittenango Falls to Chittenango village, the stream flows through a deep, narrow valley where several water powers have at one time been in use, now mostly abandoned.

The accompanying table shows the mean daily stage of the stream.

A freshet December 15, 1901, raised the water to elevation 7.0 feet on the gauge board.

This freshet went over the tops of the abutments and the adjacent highway. It also caused scour underneath the bridge, so that the discharge measurements of 1902 are not strictly comparable with those of 1901 for similar stages of the stream. The following current-meter measurements have been made during 1902:

Current-meter Discharge Measurements, Chittenango Creek at Chittenango, Madison County, N. Y

DATE.	Gauge height, feet.	Discharge second-feet.	Hydrographer.
1902.			
December 13	1.7	66.7	[b] C. C. Covert.
August 23	1.77	70.8	C. C. Covert.
April 2	2.33	205.0	E. C. Murphy.
April 2	2.33	212.0	E. C. Murphy.
July 2	2.34	[a] 184.	R. E. Horton.
July 2	2.36	216.6	R. E. Horton.
July 7	2.50	280.6	H. R. Beebe.
July 7	2.49	280.4	H. R. Beebe.

[a] At Polytechnia Street Bridge.
[b] Measurement partly through ice; stream frozen.

Drainage Areas Tributary to Chittenango Creek.

LOCATION.	Square miles.
Chittenango gauging station	[a] 77
Bridgeport gauging station	307
Mouth of stream	309

Daily Gauge Height of Chittenango Creek at Chittenango, Madison County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1						2.6	1.9	1.75	1.95	1.77½	1.80	1.92½
2						2.8	1.9	1.75	1 95	1.77½	1.80	2.02½
3						2.47½	1.85	1.8	1.85	1.77½	1.80	2.4
4						2.35	1.85	1.8	1.77½	1.77½	1.82½	1.8
5						2.3	2.0	1.8	1.8	1.77½	1.85	1.85
6						2.22½	2.1	1.82½	1.8	1.77½	1.82½	1.85
7						2.85	2 05	1.9	1.72½	1.75	1.85	1.85
8						2.62½	1.9	1.87½	1.7	1.77½	1.85	1.95
9						2.45	1.9	1.82½	1.7	1.77½	1.87½	3 35
10						2.25	1.9	1.85	1.8	1.77½	1.87½	2 4
11						2.15	1.9	1.75	1.7	1.77½	1.8	2.27½
12						2.17½	1.9	1.9	1.77½	1.77½	2.05	2.22½
13						2.1	1.8	1.9	1.85	1.77½	2 0	2.22½
14						2 05	1.8	1.9	1.77½	1.77½	1.8	2.67½
15						2.0	1.75	1.9	1.75	1.77½	1 8	4.65
16						2.0	1.8	1.85	1.75	1.77½	2.0	3.8
17						2.0	1.85	1.87½	1.8	1.77½	1.8	3.4
18						1.95	1.8	1.8	1.77½	1.8	1.8	3.3
19						1.95	1.8	1.85	1.82½	1.82½	1.8	3.0
20						2.72½	1.8	1.9	1.77½	1.8	1.8	2.45
21						2.97½	1.8	1.9	1.82½	1.77½	1.8	2.4
22					2.0	2.5	1.8	1.9	1.77½	1.77½	1.8	2.05
23					2.42½	2.85	1.8	1.9	1.77½	1.82½	1.8	2.0
24					2.15	2.4	1.8	1.92½	1.77½	1.85	1.87½	2.0
25					2.1	2.2	1.82½	1.8	1.77½	1.85	2.07½	2.0
26					2.12½	2.2	1.80	1.85	1.77½	1.85	1.95	2.0
27					2.1	2.1	1.75	1.85	1.75	1.85	1.87½	2 0
28					2.25	2.0	1.7	1.85	1.75	1.82½	2.0	2.0
29					2.47½	2.0	1.7	1.85	1.75	1.82½	1.9	2 2
30					2.65	1.9	1.87½	1.87½	1.77½	1.80	1.9	2.2
31					2.6	.....	1.82½	1 9	.....	1.80	.....	2.1

a Including Chenango River area made tributary to feed Erieville reservoir.

Daily Gauge Height of Chittenango Creek at Chittenango Madison County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
1902.												
1	2.00	1.80	4.95	2.30	1.70	1.85	2.25	2.35	1.45	1.90	1.90	1.75
2	2.00	1.80	4.52	2.30	1.70	1.80	2.00	2.45	1.65	2.15	1.90	1.75
3	2.00	4.05	4.10	2.20	1.70	2.00	2.50	2.20	1.60	1.90	1.90	2.0
4	2.00	2.80	3.50	2.30	1.70	3.65	2.30	2.10	1.60	1.90	2.00	1.8
5	2.00	2.90	3.00	2.30	1.70	2.70	2.40	2.00	1.60	1.90	2.20	1.8
6	1.95	2.60	2.30	2.30	1.70	2.40	2.73	3.00	1.60	2.10	2.20	1.8
7	1.85	2.60	2.45	2.30	1.70	2.20	2.80	2.40	1.55	2.20	2.20	1.8
8	1.80	2.30	2.60	2.20	1.70	2.50	2.50	2.45	1.50	2.25	2.15	1.8
9	1.70	2.00	2.60	2.90	1.70	2.50	2.30	2.25	1.65	2.20	2.10	1.75
10	1.70	1.85	2.60	3.05	1.70	2.60	2.68	2.20	2.05	2.10	1.85	1.75
11	1.70	1.70	2.77	2.60	1.65	2.75	2.35	2.20	1.70	2.10	1.85	1.75
12	1.70	1.70	4.05	2.60	1.60	2.90	2.10	2.10	1.60	2.05	1.95	1.8
13	1.70	1.70	4.30	2.60	1.60	2.50	2.00	2.00	1.50	1.95	1.90	1.8
14	1.70	1.70	3.30	2.50	1.60	2.35	2.20	1.95	1.50	1.85	1.90	1.8
15	1.70	1.70	3.10	2.50	1.60	2.85	2.25	1.90	1.70	1.80	2.00	1.8
16	1.70	1.70	3.10	2.33	1.60	2.75	2.20	1.85	1.70	1.85	2.00	2.4
17	1.70	1.70	4.30	2.20	1.60	2.45	2.05	1.90	1.70	2.00	1.95	2.3
18	1.70	1.70	3.30	2.20	1.60	2.20	2.00	1.90	1.70	2.10	1.90	2.2
19	1.70	1.70	2.80	2.20	1.70	2.13	2.00	1.90	1.70	2.33	1.90	2.23
20	1.70	1.70	2.60	2.20	1.80	2.10	2.65	1.85	1.70	1.95	1.80	2.2
21	1.70	1.70	2.60	2 10	1.75	2.20	2.65	1.80	1.70	1.75	1.80	2.2
22	1.85	1.80	2.80	2.00	1.70	2.10	3.25	1.80	1.70	1.75	1.80	3.15
23	1.80	1.70	2.80	1.90	1.70	2.00	2.50	1.75	1.65	1.85	1.80	2.7
24	1.70	1.70	2.50	1.90	1.70	1.90	2.35	1.70	1.60	1.90	1.80	2.5
25	1.70	1.70	2.50	1.90	1.80	1.90	2.15	1.70	1.60	1.90	1.65	2.3
26	1.70	1.70	2.50	1.90	2.15	2.20	2.10	1.70	1.90	1.90	1.65	2.3
27	2.00	1.70	2.40	1.80	1.80	2.05	3.25	1.60	1.90	1.90	1.70	2.25
28	1.90	3.50	2.40	1.80	1.85	1.90	2.80	1.60	1.90	3.10	1.75	2.2
29	1.80	.....	2.40	1.70	2.10	1.95	2.45	1.50	1.85	2.45	1.75	2.2
30	1.80	....	2.40	1.70	2.10	2.10	2.20	1.50	1.80	2.10	1.75	2.2
31	1.80	.....	2.40	.....	2.00	.....	2.20	1.50	.....	1.95	.....	2.2

Principal Water Powers on Chittenango Creek.

No. of dam.	LOCATION.	Available head. Feet.	Description.
1	Bridgeport	6	Snyder Bros.' grist mill, wheels rated 115 H. P.
1	Bridgeport	6 to 8	Snyder Bros.' saw mill, wheels rated about 20 H. P.
2	Chittenango	5	State canal feeder dam.
3	Chittenango	8	Walrath's dam abandoned iron works.
4	Chittenango	14	Chittenango roller mills. rated 57 H. P.
4	Chittenango	14	Chittenango cotton mill, abandoned, owns one-half power at dam.
5	Chittenango	8	Abandoned distillery.
6	Chittenango Springs	6 to 8	Nesbet's saw mill.
7	Above Chittenango Springs.	6 to 8	Marl lime and saw mill.
8	Chittenango Falls	120	Undeveloped.
9	Chittenango Falls	10 to 12	Abandoned repair shop.
10	Cazenovia	10	Bentley's dam. grist mill.

GAUGINGS OF SKANEATELES LAKE OUTLET.

Skaneateles Lake is fifth in size of the Finger Lakes tributary to Seneca River. Its run-off is of special interest as illustrating the effect of lake storage on the regimen of flow of that stream. The lake lies in a deep, narrow valley conducive to rapid run-off, so that the water level of the lake fluctuates frequently. Owing to extensive lake storage, the variations in the outflow are very moderate. The lake and its watershed are shown on the Skaneateles Quadrangle of the Topographic Survey of the State. The watershed areas are as follows:

Land surface above State dam at Skaneateles	60.25	square miles.
Water surface of lake at Skaneateles	12.75	square miles.
Total drainage area above foot of lake	73	square miles.
Total area above Willow Glen weir	74.25	square miles.
Total area above Erie Canal at Jordan	93	square miles.

The elevation of Skaneateles Lake is 867 feet above mean tide, and that of the outlet at Erie Canal crossing, near Jordan, about 400 feet. The intervening fall of 467 feet is largely taken up by water powers situated at seventeen dams on the outlet in the intervening length of 12 miles. The power is chiefly used for paper, woolen, flour, and furniture manufacturing.

The dam at the foot of the lake was originally constructed by the State of New York in 1844. In 1893 the masonry dam at the foot of the lake was rebuilt by the Syracuse Water Board, and since July 1, 1894, the lake has been used as the storage reservoir for the municipal supply of the city of Syracuse, the water being taken a distance of 19¼ miles through a 30-inch cast-iron conduit.

A record of the elevation of water in Skaneateles Lake reservoir has been kept each week since January 1, 1878, by gatekeepers of New York State canals. The results of this record may be found in the annual report of the Superintendent of Public Works on canals, for 1899, pages 156-159.

In connection with condemnation proceedings for the acquisition of water rights on Skaneateles outlet by the city of Syracuse, a number of gaugings of the outflow from the lake were made; some of the results of which have been reduced to second-feet and are given below.[a]

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[a] Abstracted from proceedings and evidence before Commissioners of Appraisal, Supreme Court, Appellate Division, Fourth Department, City of Syracuse, vs. Richard M. Stacey et al., Vols. I-X, inclusive.

Mean Daily Flow in Second-feet at Skaneateles Lake at State Dam, Skaneateles, N. Y.
[Drainage area 73 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1890.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	108.8	102.1	121.9
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	108.8	18.9	121.2
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	107.8	101.7	120.9
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	106.9	105.1	122.6
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	105.5	101.5	121.1
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	105.1	99.9	119.4
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	104.0	98.6	.....
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	101.7	101.7	116.8
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	102.5	101.4	117.3
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.1	98.3	121.4
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	96.1	99.4	118.4
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	96.6	101.9	116.7
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	94.8	105.7	116.3
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	94.2	112.1	114.1
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	92.8	115.5	94.2
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	93.0	118.4	109.1
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	95.5	118.3	.....
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	97.3	117.8	112.8
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	101.5	114.8	114.2
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	98.9	116.7	112.1
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	97.9	114.8	114.7
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	98.3	113.6	112.4
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	101.7	113.3	107.7
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	104.6	117.0	107.8
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	102.9	117.2	.....
26	.....	.....	.....	.....	.....	.....	.....	.....	126.8	99.9	116.7	107.8
27	.....	.....	.....	.....	.....	.....	.....	.....	119.8	100.4	106.2	108.2
28	.....	.....	.....	.....	.....	.....	.....	.....	117.8	103.8	122.6	107.8
29	.....	.....	.....	.....	.....	.....	.....	.....	112.7	101.9	122.5	105.8
30	.....	.....	.....	.....	.....	.....	.....	.....	112.1	101.1	120.6	107.7
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	102.9	.....	107.3
Mean	.....	.....	.....	.....	.....	.....	.....	.....	117.8	100.9	107.5	113.4
1891.												
1	108.0	113.5	.....	235.6	120.6	.....	.....	.....	.....	.....	.....	.....
2	107.6	112.2	124.6	255.6	122.7	.....	102.3	.....	.....	.....	.....	.....
3	102.7	117.6	139.5	220.1	119.8	.....	82.3	.....	.....	.....	.....	.....
4	103.2	117.2	143.8	215.5	116.3	.....	80.9	.....	.....	.....	.....	.....
5	102.7	118.3	143.8	209.3	112.8	94.2	80.9	.....	.....	.....	.....	.....
6	102.7	98.1	139.2	204.6	.....	93.6	78.4	.....	.....	.....	.....	.....
7	102.1	112.7	139.2	201.5	.....	.....	80.4	.....	.....	.....	.....	.....
8	101.9	114.2	139.2	196.8	.....	82.7	80.4	.....	.....	.....	.....	.....
9	102.1	117.9	139.2	189.1	.....	99.9	79.9	.....	.....	.....	.....	.....
10	101.8	103.4	139.2	199.9	.....	96.7	82.5	.....	.....	.....	.....	.....
11	101.9	116.6	159.6	215.5	.....	95.2	88.5	.....	.....	.....	.....	.....
12	102.6	117.3	167.4	.....	.....	95.5	.....	.....	.....	.....	.....	.....
13	103.8	95.0	182.9	196.8	.....	92.7	87.7	.....	.....	.....	.....	.....
14	104.5	98.3	195.3	190.6	.....	92.1	86.9	.....	.....	.....	.....	.....
15	103.5	117.9	.....	195.3	.....	91.6	93.7	.....	.....	.....	.....	.....
16	95.5	119.5	189.1	195.3	.....	87.4	92.5	.....	.....	.....	.....	.....
17	89.1	.....	186.0	193.7	.....	87.3	77.5	.....	.....	.....	.....	.....
18	104.3	87.7	182.9	192.2	.....	96.6	92.4	.....	.....	.....	.....	.....
19	90.9	94.8	176.7	.....	.....	107.7	88.9	.....	.....	.....	.....	.....
20	93.0	112.5	181.4	186.0	.....	104.8	89.4	.....	.....	.....	.....	.....
21	92.7	.....	176.7	179.8	.....	104.0	90.5	.....	.....	.....	.....	.....
22	108.8	122.4	.....	179.8	.....	104.5	90.7	.....	.....	.....	.....	.....
23	106.5	124.0	.....	170.5	.....	103.1	91.9	.....	.....	.....	.....	.....
24	107.3	121.1	.....	167.4	.....	104.2	90.9	.....	.....	.....	.....	.....
25	107.7	128.0	258.8	164.3	.....	102.6	91.3	.....	.....	.....	.....	.....
26	108.9	132.7	251.1	.....	.....	101.7	.....	.....	.....	.....	.....	.....
27	106.8	135.0	248.0	131.3	.....	90.9	89.7	.....	.....	.....	.....	.....
28	105.5	145.8	240.1	125.4	.....	90.8	104.3	.....	.....	.....	.....	.....
29	105.4	.....	234.1	124.6	.....	89.9	124.1	.....	.....	.....	.....	.....
30	108.3	.....	232.5	122.1	.....	100.4	150.4	.....	.....	.....	.....	.....
31	110.9	.....	240.1	.....	.....	.....	148.3	.....	.....	.....	.....	.....
Mean	102.9	115.2	182.7	186.6	116.4	96.4	94.9	.....	.....	.....	.....	.....

The records included are as follows:

At State dam, at foot of lake, October 26, 1890, to July 31, 1891.

At Stott's farm weir, August 16, 1892, to September 19, 1893.

At Stott's farm weir, June 6, 1894, to December 2, 1894.

At Jordan, September 26, 1890, to October 28, 1891.

At Jordan, August 16, 1892, to November 30, 1892.

At Old Willow Glen weir, March 10, to July 13, 1895.

At New Willow Glen weir, July 14, 1895, to date.

The first table shows the estimated discharge through the dam at the foot of the lake for the period from September 26, 1890, to February 27, 1892, inclusive. At the time these measurements were made the dam had a spillway 48 feet in length, with a flat and nearly horizontal crest 4.5 feet in width. The crest was obstructed by supports for a foot bridge by which the overflow was divided into a number of shorter sections. There were also six rectangular gateways through the dam, having their sills at a uniform elevation of 9.33 feet below the crest line. Four gateways were 4 feet wide and two were 3.5 feet in width. Sliding wooden sluice gates were used, which were capable of being raised 4 or 5 feet. No allowance for leakage has been made, and the results are considered as somewhat roughly approximate.

The second series of tables shows the results of measurements of discharge of Skaneateles Lake at the Stott's Farm weir, situated 6,000 feet north of the foot of the lake and recovering drainage from 1.25 square miles tributary to the outlet, in addition to the drainage area of the lake itself. The weir had a clear crest 30 feet in length and ¼ inch in breadth. The flow has been computed by means of the Francis formula for a sharp crested weir. The crest was somewhat irregular, and the resulting calculated discharge is considered as roughly approximate only.

Mean Daily Flow in Second-feet, Skaneateles Outlet at Stott's Weir, Willow Glen, N. Y.

[Drainage area, 74 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1892.												
1	....	....	....	....	....	....	....	....	98.6	97.9	86.2	88.4
2	....	....	....	....	....	....	....	....	100.9	....	78.4	87.6
3	....	....	....	....	....	....	....	....	95.6	102.5	78.4	82.6
4	....	....	....	....	....	....	....	....	....	109.3	91.1	....
5	....	....	....	....	....	....	....	....	99.4	107.7	88.4	77.0
6	....	....	....	....	....	....	....	....	94.1	103.2	....	74.2
7	....	....	....	....	....	....	....	....	94.8	102.5	85.6	73.6
8	....	....	....	....	....	....	....	....	103.2	98.3	86.2	95.6
9	....	....	....	....	....	....	....	....	102.5	....	84.8	88.4
10	....	....	....	....	....	....	....	....	100.9	97.9	85.6	85.6
11	....	....	....	....	....	....	....	....	....	94.8	86.2	....
12	....	....	....	....	....	....	....	....	97.9	....	82.6	82.6
13	....	....	....	....	....	....	....	....	97.9	101.7	....	81.8
14	....	....	....	....	....	....	....	....	96.4	100.9	78.4	84.0
15	....	....	....	....	....	....	....	....	110.1	101.7	77.0	85.6
16	....	....	....	....	....	....	....	104.0	111.6	....	81.2	84.8
17	....	....	....	....	....	....	....	103.2	110.8	99.4	79.8	82.6
18	....	....	....	....	....	....	....	104.0	....	96.4	80.4	....
19	....	....	....	....	....	....	....	119.5	107.7	106.9	92.7	81.9
20	....	....	....	....	....	....	....	103.2	103.2	95.6	....	81.2
21	....	....	....	....	....	....	....	....	104.0	94.8	88.4	81.2
22	....	....	....	....	....	....	....	121.1	100.1	94.1	85.6	80.4
23	....	....	....	....	....	....	....	120.3	104.0	....	88.4	81.2
24	....	....	....	....	....	....	....	121.1	106.9	91.1	92.7	81.2
25	....	....	....	....	....	....	....	146.6	....	90.5	89.7	....
26	....	....	....	....	....	....	....	99.4	105.4	89.1	85.6	....
27	....	....	....	....	....	....	....	98.6	105.4	96.4	....	81.2
28	....	....	....	....	....	....	....	....	97.9	88.4	89.1	80.4
29	....	....	....	....	....	....	....	96.4	98.6	88.4	86.9	78.4
30	....	....	....	....	....	....	....	100.1	101.7	94.8	85.6	77.8
31	....	....	....	....	....	....	....	98.6	....	....	....	77.0
Mean	....	....	....	....	....	....	....	109.7	101.9	97.7	85.2	82.1
1893.												
1	....	67.6	77.0	88.4	100.1	241.8	156.5	....	....	....	....	....
2	79.8	67.6	77.8	....	98.6	224.7	....	....	....	....	....	....
3	82.6	69.6	77.0	89.1	97.0	221.6	153.6	....	....	....	....	....
4	80.4	68.4	76.4	88.4	187.5	....	153.6	....	....	....	....	....
5	78.4	....	....	87.6	254.2	220.1	151.7	....	....	....	....	....
6	76.4	71.6	75.6	88.4	254.2	195.3	150.0	....	....	....	....	....
7	75.6	78.4	74.2	89.7	....	179.8	148.3	....	....	....	....	....
8	....	76.4	73.0	89.7	254.2	128.3	164.3	....	....	....	....	....
9	71.6	74.2	81.8	....	234.1	123.4	....	....	....	....	....	....
10	68.9	72.2	79.8	89.7	234.1	121.8	164.3	....	....	....	....	....
11	69.6	70.9	77.0	89.1	234.1	....	164.3	....	119.6	....	....	....
12	68.9	....	....	85.6	230.9	118.7	164.3	....	112.5	....	....	....
13	68.9	77.0	75.0	83.4	227.8	153.6	164.3	....	112.5	....	....	....
14	67.6	78.4	75.6	88.4	....	151.7	164.3	....	117.2	....	....	....
15	....	76.4	74.2	91.1	224.7	150.0	162.7	....	129.1	....	....	....
16	63.7	74.2	75.0	....	221.6	148.3	....	....	113.6	....	....	....
17	61.2	75.0	77.0	94.1	230.9	145.1	165.8	....	....	....	....	....
18	63.7	75.6	78.4	100.1	234.1	....	164.3	....	120.6	....	....	....
19	61.2	....	....	101.7	246.5	141.7	161.2	....	115.0	....	....	....
20	58.6	75.6	81.2	100.1	244.9	141.7	161.2	....	....	....	....	....
21	56.1	....	81.8	101.7	....	141.7	156.5	....	....	....	....	....
22	....	73.0	85.6	100.1	237.2	145.1	155.0	....	....	....	....	....
23	....	77.0	86.9	....	246.5	148.3	....	....	....	....	....	....
24	66.3	77.8	88.4	103.1	252.6	146.6	151.7	....	....	....	....	....
25	64.3	77.0	88.4	98.6	249.5	....	148.3	....	....	....	....	....
26	63.7	....	....	97.0	246.5	143.4	151.7	....	....	....	....	....
27	58.6	78.4	86.9	95.6	244.9	145.1	151.7	....	....	....	....	....
28	57.4	77.0	85.6	94.1	....	143.5	135.9	....	....	....	....	....
29	....	....	84 0	92.7	243.4	145.1	56.1	....	....	....	....	....
30	68.9	....	84.8	....	241.8	145.1	....	....	....	....	....	....
31	68.4	....	86.9	....	241.8	....	....	....	....	....	....	....
Mean	68.0	74.7	80.2	93.1	222.7	158.1	157.3	....	117.5	....	....	....

Mean Daily Flow in Second-feet, Skaneateles Outlet, Stott's Weir, Willow Glen, N.Y.—(Concluded)

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1894.												
1	....	....	....	....	....	....	....	54.0	37.5	78.0	81.0	72.2
2	....	....	....	....	....	....	15.4	56.4	66.8	78.0	78.0	78.0
3	....	....	....	....	....	....	19.	59.0	66.8	78.0	84.0	....
4	....	....	....	....	....	....	17.2	59.0	65.5	81.0	84.0	....
5	....	....	....	....	....	....	15.4	54.0	66.8	81.0	84.0	....
6	....	....	....	....	....	7.5	15.4	56.0	81.0	81.0	84.0	....
7	....	....	....	....	....	5.7	17.2	56.0	102.0	78.0	84.0	....
8	....	....	....	....	....	4.5	....	54.0	102.0	78.0	84.0	....
9	....	....	....	....	....	4.0	39.7	59.0	105.0	81.0	81.0	....
10	....	....	....	....	....	....	42.0	54.0	81.0	87.0	81.0	....
11	....	....	....	....	....	3.5	35.2	56.0	78.0	87.0	78.0	....
12	....	....	....	....	....	4.0	31.0	54.0	78.0	84.0	78.0	....
13	....	....	....	....	....	4.5	29.0	54.0	81.0	87.0	78.0	....
14	....	....	....	....	....	3.5	31.0	56.0	84.0	84.0	78.0	....
15	....	....	....	....	....	3.5	....	56.0	81.0	87.0	78.0	....
16	....	....	....	....	....	3.5	27.0	54.0	81.0	87.0	78.0	....
17	....	....	....	....	....	....	25.0	54.0	81.0	87.0	81.0	....
18	....	....	....	....	....	2.5	25.0	56.0	84.0	81.0	81.0	....
19	....	....	....	....	....	10.0	23.0	64.2	86.8	81.0	78.0	....
20	....	....	....	....	....	2.	23.0	61.6	86.8	81.0	78.0	....
21	....	....	....	....	....	23.0	27.0	59.0	86.8	81.0	78.0	....
22	....	....	....	....	....	11.0	....	56.0	84.0	78.0	78.0	....
23	....	....	....	....	....	2.6	27.0	54.0	81.0	81.0	78.0	....
24	....	....	....	....	....	....	31.0	61.6	78.0	84.0	78.0	....
25	....	....	....	....	....	6.8	37.6	64.2	78.0	84.0	78.0	....
26	....	....	....	....	....	21.0	72.2	61.6	78.0	81.0	78.0	....
27	....	....	....	....	....	17.2	69.7	64.2	78.0	75.2	78.0	....
28	....	....	....	....	....	27.0	59.0	61.6	75.1	75.2	75.2	....
29	....	....	....	....	....	29.0	....	61.6	72.2	75.2	75.2	....
30	....	....	....	....	....	25.0	56.6	59.0	72.2	75.2	75.2	....
31	....	....	....	....	....	....	54.0	56.4	....	78.0	....	....
Mean	....	....	....	....	....	10.1	33.2	56.0	79.3	81.2	79.4	75.1

In order to determine the run-off to the watershed contributed by the drainage area of the outlet itself, from the foot of the lake to Jordan, the following series of gaugings were made, covering the period from September 26, 1890, to November 30, 1892. The drainage area of 93 square miles at Jordan includes 73 square miles, the run-off from which is subject to lake storage, and 20 square miles which drains directly into the outlet. The discharge measurements at Jordan from which the daily record was computed, were made by means of tube floats, by timing the interval required for their passage through a section of the stream channel 100 feet in length.

Mean Daily Flow in Second-feet, Skaneateles Outlet, Jordan, Onondaga Co., N. Y.

[Drainage area, 93 square miles.]

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1890.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	154.2	146.3	162.7
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	159.6	116.1	175.2
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	144.5	159.6	167.4
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	147.4	152.7	152.5
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	143.7	146 8	167.4
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	158.1	142.9	168.9
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	159.6	133.5	.....
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	155.0	147.8	128.4
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	164.3	151.4	178.3
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	150.9	158.1	158.1
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	155.0	143.5	148.9
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	146.6	161.2	149.2
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	151.6	158.1	161.2
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	156.5	161.2	159.6
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	137.5	171.0	176.7
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	137.9	156.5	181.4
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	149.7	152.2	.....
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	141.1	.....	161.2
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	168.9	161.2	141.7
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	164.3	179 8	.....
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	165.8	168.9	.....
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	153.6	158.1	179.8
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	151.7	133.1	165.8
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	209.3	.....	147.8
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	179.8	175.2	.....
26	.....	.....	.....	.....	.....	.....	.....	.....	170.5	123.2	173.6	.....
27	.....	.....	.....	.....	.....	.....	.....	.....	162.8	147.1	162.7	.....
28	.....	.....	.....	.....	.....	.....	.....	.....	154.5	153.7	156.5	.....
29	.....	.....	.....	.....	.....	.....	.....	.....	150.0	158.1	158.1	.....
30	.....	.....	.....	.....	.....	.....	.....	.....	145.2	135.2	161.2	.....
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	155.0	.....	.....
Mean	.....	.....	.....	.....	.....	.....	.....	.....	156.6	153.9	155.2	161.5
1891.												
1	.....	.....	.....	.....	.....	.....	.....	189.1	.....	.....	.....	.....
2	.....	.....	.....	.....	.....	.....	139.2	154.5	.....	.....	.....	.....
3	.....	.....	.....	.....	.....	.....	91.9	153.7	.....	.....	.....	.....
4	.....	.....	.....	.....	.....	.....	106.6	123.7	139.5	.....	.....	.....
5	.....	.....	.....	.....	.....	.....	108.9	144.3	141.3	148.2	.....	.....
6	.....	.....	.....	.....	.....	.....	114.7	150.4	.....	.....	.....	.....
7	.....	.....	.....	.....	.....	.....	108.5	182.9	139.2	154.8	.....	.....
8	.....	.....	.....	.....	.....	.....	111.1	182.9	.....	156.5	.....	.....
9	.....	.....	.....	.....	.....	.....	120.4	.....	143.1	153.7	.....	.....
10	.....	.....	.....	.....	.....	.....	74.8	.....	.....	150.5	.....	.....
11	.....	.....	.....	.....	.....	129.1	118.8	168.9	151.3	139.6	.....	.....
12	.....	.....	.....	.....	.....	127.8	.....	172.1	162.7	145.8	.....	.....
13	.....	.....	.....	.....	.....	121.2	118.3	172.0	150.4	146.0	.....	.....
14	.....	.....	.....	.....	.....	119.5	117.0	164.3	153.1	.....	.....	.....
15	.....	.....	.....	.....	.....	126.0	130.8	158.1	153.3	.....	.....	.....
16	.....	.....	.....	.....	.....	125.2	122.3	152.7	149.6	139.9	.....	.....
17	.....	.....	.....	.....	.....	119.6	120.7	159.6	151.4	143.4	.....	.....
18	.....	.....	.....	.....	.....	119.5	110.1	165.8	149.8	.....	.....	.....
19	.....	.....	.....	.....	.....	130.2	123.7	156.5	141.5	154.1	.....	.....
20	.....	.....	.....	.....	.....	130.8	126.5	158.1	140.1	156.5	.....	.....
21	.....	.....	.....	.....	.....	130.0	121.9	138.8	148.0	164.3	.....	.....
22	.....	.....	.....	.....	.....	143.9	112.2	144.6	139.8	155.0	.....	.....
23	.....	.....	.....	.....	.....	133.5	97.0	159.6	146.2	152.2	.....	.....
24	.....	.....	.....	.....	.....	132.2	102.6	146.2	141.1	149.8	.....	.....
25	.....	.....	.....	.....	.....	130.9	98.4	132.1	141.5	135.6	.....	.....
26	.....	.....	.....	.....	.....	128.8	.....	128.2	151.4	.....	.....	.....
27	.....	.....	.....	.....	.....	134.5	100.6	123.2	.....	139.3	.....	.....
28	.....	.....	.....	.....	.....	116.8	113.2	.....	.....	140.3	.....	.....
29	.....	.....	.....	.....	.....	119.5	.....	123.4	.....	.....	.....	.....
30	.....	.....	.....	.....	.....	137.3	.....	.....	.....	.....	.....	.....
31	.....	.....	.....	.....	.....	.....	187.5	118.1	.....	.....	.....	.....
Mean	.....	.....	.....	.....	.....	127.8	115.3	153.1	146.6	148.7	.....	.....

Mean Daily Flow in Second-feet, Skaneateles Outlet, Jordan, Onondaga Co., N. Y.—(Concluded)

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1892.												
1	.....	.....	.....	.....	.....	.....	.....	.....	108.6	117.3	.....	.....
2	.....	.....	.....	.....	.....	.....	.....	.....	98.9	.....	.....	.....
3	.....	.....	.....	.....	.....	.....	.....	.....	105.7	119.6	117.3	.....
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	128.8	118.3	.....
5	.....	.....	.....	.....	.....	.....	.....	.....	110.4	150.8	115.8	.....
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	132.5	.....	.....
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	124.3	113.9	.....
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	121.6	.....	.....
9	.....	.....	.....	.....	.....	.....	.....	.....	123.7	.....	.....	.....
10	.....	.....	.....	.....	.....	.....	.....	.....	103.4	119.6	108.6	.....
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	111.9	.....	.....
12	.....	.....	.....	.....	.....	.....	.....	.....	111.1	.....	109.7	.....
13	.....	.....	.....	.....	.....	.....	.....	.....	105.8	118.8	.....	.....
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	117.9	112.2	.....
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	116.1	101.7	.....
16	.....	.....	.....	.....	.....	.....	.....	122.5	115.6	.....	.....	.....
17	.....	.....	.....	.....	.....	.....	.....	119.5	122.1	119.2	109.4	.....
18	.....	.....	.....	.....	.....	.....	.....	118.3	.....	115.8	114.8	.....
19	.....	.....	.....	.....	.....	.....	.....	113.3	124.5	110.9	136.5	.....
20	.....	.....	.....	.....	.....	.....	.....	123.1	122.5	113.5	.....	.....
21	.....	.....	.....	.....	.....	.....	.....	.....	117.5	.....	126.9	.....
22	.....	.....	.....	.....	.....	.....	.....	144.5	.....	.....	119.9	.....
23	.....	.....	.....	.....	.....	.....	.....	134.2	117.2	.....	109.4	.....
24	.....	.....	.....	.....	.....	.....	.....	145.1	126.5	.....	113.7	.....
25	.....	.....	.....	.....	.....	.....	.....	170.5	.....	.....	114.5	.....
26	.....	.....	.....	.....	.....	.....	.....	143.8	140.9	.....	107.8	.....
27	.....	.....	.....	.....	.....	.....	.....	122.3	129.4	.....	.....	.....
28	.....	.....	.....	.....	.....	.....	.....	.....	123.5	.....	119.9	.....
29	.....	.....	.....	.....	.....	.....	.....	117.8	110.5	.....	113.9	.....
30	.....	.....	.....	.....	.....	.....	.....	112.1	113.5	.....	108.9	.....
31	.....	.....	.....	.....	.....	.....	.....	113.3	.....	.....	.....	.....
Mean	.....	.....	.....	.....	.....	.....	.....	128.5	116.5	121.2	114.6	.....

Beginning March 6, 1895, a daily record of the depth of water, flowing over a standard sharp crested gauging weir, has been kept by the water department of Syracuse. The weir is located at Willow Glen, one and one-half miles below the foot of the lake. It has complete contractions at the ends; the length of crest being as follows:

March 6, to July 13, 1895, inclusive........ 29.5 feet.
July 14, 1895, to date...................... 27.0 feet.

The discharge over this weir has been calculated by means of the Francis formula, with proper allowances for end contractions and velocity of approach. Four current meter measurements of the discharge of Skaneateles outlet were made during 1901.

Measurements of Skaneateles Outlet at Willow Glen, N. Y.

DATE.	Depth on weir, inches.	Calculated flow over weir, second-feet.	DISCHARGED BY CURRENT METER.	
			Second-feet.	Per cent. of weir discharge.
July 20, 1901 [b]	13.75	113.0	117.8	104.2
August 29, 1901 [c]	11.97	90.8	92	101.3
August 29, 1901 [c]	12.02	91.2	88	96.5
August 29, 1901 [c]	12.02	91.2	92	101.3

[b] R. E. Horton, Hydrographer.
[c] E. C. Murphy, Hydrographer.

The crest is level and the depth of overflow is measured from a stake 5.2 feet upstream from the weir. The channel above is straight and has an average depth of about 1.5 feet below the weir crest. The velocity of approach varies from zero to two feet per second. As stated above, water has been diverted from Skaneateles Lake, beginning July 1, 1894.

The following tables represent the mean daily flow in the outlet, not including diversion. The table represents the actual volume of water flowing down the outlet channel. To obtain the total run-off from the watershed, the amount of diversion for municipal supply should be added. This has been done in the following summary, showing the actual run-off in inches on the watershed deduced from all the available records. The flow in the conduit leading from Skaneateles dam to Syracuse is determined by measuring the effective head and area of discharge in the gatehouse at Skaneateles village. The gates are four in number. They are 2.5 feet wide and 4.5 feet high. The flow is regulated by gate No. 3, and the discharge is calculated for each day from the formula for orifices. The coefficient used is stated to be 0.62.

The recorded depths on Willow Glen weir, together with the estimated monthly water consumption by the city of Syracuse, have been furnished by the Superintendent, Syracuse Water Department. The depth on weir is observed once each day by Edward Conron.

Mean Monthly Run-off of Skaneateles Outlet at Stott's Weir, Willow Glen, N. Y.

[Drainage area 74 square miles.]

MONTH.	SECOND-FEET.			SECOND FEET, PER SQUARE MILE.			INCHES ON DRAINAGE AREA.		
	1892.	1893.	1894.	1892.	1893.	1894.	1892.	1893.	1894.
January	......	68.0	......	......	.92	......	......	1.06	......
February	......	74.7	......	......	1.01	......	......	1.05	......
March	......	80.2	......	......	1.08	......	......	1.24	......
April	......	93.1	......	......	1.26	......	......	1.41	......
May	......	222.7	......	......	3.01	......	......	3.46	......
June	......	158.1	10.1	......	2.13	.14	......	2.39	.16
July	......	157.3	33.2	......	2.12	.45	......	2.44	.52
August	109.7	......	56.0	1.46	......	.76	1.68	......	.87
September	101.9	117.5	79.3	1.38	1.59	1.07	1.55	1.78	1.19
October	97.7	......	81.2	1.32	......	1.09	1.52	......	1.25
November	85.2	......	79.4	1.15	......	1.07	1.29	......	1.19
December	82.1	......	75.1	1.11	......	1.01	1.28	......	1.16

Mean Daily Flow in Second Feet, Skaneateles Outlet at Willow Glen Weir.

[Drainage area 74 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1895.												
1	.....	.....	.....	103.4	112.8	85.4	77.0	100.3	100.3	95.7	100.3	94.2
2	.....	.....	.....	103.4	109.7	85.4	82.6	97.2	100.3	97.2	97.2	97.2
3	.....	.....	.....	103.4	109.7	85.4	82.6	97.2	100.3	95.7	97.2	97.2
4	.....	.....	.....	103.4	156.6	85.4	82.6	97.2	100.3	95.7	97.2	97.2
5	.....	.....	.....	103.4	160.2	85.4	85.4	100.3	100.3	95.7	97.2	94.2
6	.....	.....	.....	103.4	156.6	91.4	85.4	100.3	97.2	95.7	97.2	85.5
7	.....	.....	.....	106.5	150.0	85.4	85.4	100.3	97.2	95.7	97.2	80.0
8	.....	.....	.....	103.4	150.0	85.4	85.4	100.3	100.3	95.7	100.3	81.4
9	.....	.....	.....	109.8	109.8	85.4	85.4	100.3	97.2	97.2	106.6	81.4
10	.....	.....	2.8	136.0	109.8	85.4	85.4	100.3	97.2	95.7	100.3	80.0
11	.....	.....	43.7	149.8	109.8	85.4	85.4	98.8	97.2	95.7	100.3	80.0
12	.....	.....	66.0	186.0	112.8	85.4	85.4	100.3	97.2	97.2	100.3	80.0
13	.....	.....	91.4	186.0	112.8	85.4	88.4	100.3	97.2	100.3	94.2	80.0
14	.....	.....	91.4	186.0	122.4	85.4	81.4	97.2	95.7	97.2	94.2	80.0
15	.....	.....	85.4	171.0	129.0	85.4	88.3	97.2	95.7	97.2	94.2	80.0
16	.....	.....	91.4	171.0	122.4	85.4	88.3	97.2	95.7	95.7	94.2	80.0
17	.....	.....	91.4	167.4	122.4	85.4	88.3	97.2	95.7	97.2	94.2	80.0
18	.....	.....	88.4	167.4	122.4	85.4	88.3	97.2	95.7	100.3	94.2	80.0
19	.....	.....	91.4	164.0	97.6	85.4	91.2	95.7	95.7	100.3	94.2	81.4
20	.....	.....	100.2	164.0	91.4	82.6	94.2	95.7	100.3	100.3	97.2	80.0
21	.....	.....	100.2	164.0	85.4	82.6	94.2	95.7	95.7	100.3	97.2	80.0
22	.....	.....	97.6	167.4	85.4	85.4	94.2	97.2	95.7	100.3	97.2	82.8
23	.....	.....	97.6	167.4	85.4	85.4	94.2	97.2	95.7	100.3	97.2	82.8
24	.....	.....	97.6	164.0	85.4	82.6	94.2	97.2	95.7	100.3	100.3	82.8
25	.....	.....	100.2	164.0	85.4	79.8	94.2	97.2	95.7	106.6	100.3	82.8
26	.....	.....	100.2	164.0	85.4	79.8	94.2	95.7	95.7	106.6	100.3	82.8
27	.....	.....	94.5	136.0	103.4	79.8	94.2	95.7	95.7	106.6	97.2	85.5
28	.....	.....	94.5	122.4	85.4	79.8	100.3	95.7	95.7	106.6	94.2	85.5
29	.....	.....	97.6	119.2	91.4	79.8	100.3	97.2	97.2	106.6	94.2	85.5
30	.....	.....	94.5	116.0	85.4	77.0	103.4	97.2	97.2	100.3	94.2	82.8
31	.....	.....	100.4	.....	85.4	.....	100.3	97.2	.....	100.3	.....	82.8
Mean	.....	.....	87.2	145.7	110.7	84.0	89.7	97.8	97.2	99.2	97.3	84.1

Mean Daily Flow in Second-feet, Skaneateles Outlet at Willow Glen Weir—(Continued).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1896.												
1	82.6	80.0	91.2	103.4	109.8	78.7	77.3	77.3	82.8	85.5	77.3	73.4
2	80.0	80.0	91.2	91.2	109.8	78.7	77.3	78.7	82.8	85.5	77.3	73.4
3	80.0	80.0	82.8	82.8	91.2	78.7	77.3	78.7	82.8	85.5	77.3	73.4
4	80.0	80.0	82.8	82.8	85.5	78.7	77.3	78.7	82.8	77.3	77.3	73.4
5	80.0	80.0	82.8	85.5	85.5	78.7	77.3	78.7	82.8	77.3	77.3	69.6
6	80.0	82.8	82.8	82.8	85.5	78.7	77.3	78.7	82.8	77.3	77.3	70.9
7	80.0	82.8	109.8	82.8	91.2	89.8	77.3	78.7	82.8	77.3	76.0	70.9
8	80.0	82.8	91.2	82.8	91.2	89.8	77.3	78.7	82.8	84.1	76.0	74.7
9	80.0	85.5	82.8	80.0	91.2	89.8	77.3	78.7	82.8	80.0	76.0	74.7
10	78.7	82.8	82.8	80.0	86.9	88.3	77.3	78.7	82.8	77.3	76.0	72.2
11	78.7	80.0	82.8	80.0	86.9	88.3	77.3	78.7	82.8	77.3	76.0	69.6
12	80.0	80.0	82.8	80.0	86.9	88.3	76.0	78.7	82.8	77.3	74.7	69.6
13	80.0	80.0	82.8	82.8	80.0	88.3	76.0	78.7	82.8	80.0	74.7	69.6
14	80.0	85.5	82.8	80.0	80.0	88.3	76.0	78.7	82.8	82.8	76.0	69.6
15	80.0	82.8	85.5	81.4	80.0	88.3	76.0	78.7	82.8	82.8	74.7	68.4
16	80.0	80.0	85.5	81.4	80.0	88.3	76.0	78.7	81.4	81.4	74.7	67.1
17	80.0	82.8	85.5	81.4	78.7	88.3	76.0	78.7	81.4	80.0	74.7	67.1
18	80.0	82.8	85.5	82.8	78.7	81.4	76.0	80.0	82.8	80.0	74.7	67.1
19	82.8	82.8	85.5	81.4	78.7	81.4	74.7	80.0	85.5	78.7	74.7	65.9
20	80.0	82.8	85.5	81.4	78.7	81.4	76.0	80.0	85.5	78.7	74.7	65.9
21	80.0	80.0	85.5	82.8	78.7	83.8	74.7	80.0	85.5	78.7	74.7	65.9
22	80.0	80.0	82.8	82.8	78.7	82.8	74.7	80.0	85.5	78.7	76.0	65.9
23	77.3	82.8	82.8	81.4	78.7	80.0	74.7	78.7	81.4	78.7	77.3	65.9
24	80.0	80.0	82.8	81.4	78.7	80.0	74.7	78.7	81.4	77.3	80.0	65.9
25	80.0	80.0	82.8	81.4	78.7	80.0	74.7	78.7	85.5	77.3	80.0	65.9
26	80.0	80.0	88.3	80.0	80.0	78.7	74.7	78.7	85.5	77.3	74.7	65.9
27	80.0	80.0	80.0	80.0	80.0	78.7	74.7	78.7	85.5	77.3	77.3	65.9
28	80.0	85.5	77.3	78.7	80.0	78.7	74.7	78.7	85.5	77.3	80.0	65.9
29	80.0	109.8	85.5	78.7	80.0	80.0	78.6	78.7	85.5	77.3	74.7	64.6
30	80.0	.....	100.3	109.8	80.0	78.7	78.6	78.7	85.5	77.3	73.4	64.6
31	80.0	.....	100.3	.....	78.7	.....	77.3	78.7	.....	77.3	.....	65.9
Mean	80.0	82.5	89.1	83.4	84.3	83.1	76.3	78.8	83.5	79.4	76.2	68.6
1897.												
1	65.8	60.9	62.1	5.80	2.55	72.2	77.3	74.7	80.0	74.7	88.3	65.9
2	65.8	59.7	60.9	5.80	3.00	72.2	76.0	85.5	80.0	74.7	88.3	65.9
3	65.8	59.7	62.1	5.80	3.00	74.7	76.0	85.5	80.0	74.7	91.2	65.9
4	65.8	59.7	64.6	5.80	5.20	74.7	74.7	85.5	80.0	74.7	89.8	65.9
5	70.9	59.7	64.6	5.80	3.00	74.7	74.7	97.2	80.0	74.7	89.8	72.2
6	67.1	59.7	67.1	6.40	2.55	73.4	74.7	129.2	80.0	74.7	89.8	72.2
7	67.1	59.7	67.1	8.80	41.7	72.2	74.7	189.2	80.0	77.3	89.8	69.6
8	64.6	59.7	64.6	5.80	72.2	72.2	74.7	189.2	78.7	77.3	89.8	67.1
9	64.6	60.9	68.4	7.60	69.6	72.2	74.7	132.5	77.3	85.5	89.8	67.1
10	64.6	60.9	69.6	8.80	25.5	74.7	74.7	97.2	77.3	91.2	100.3	67.1
11	64.6	60.9	67.1	6.40	69.6	72.2	74.7	109.8	77.3	91.2	100.3	67.1
12	65.8	60.9	67.1	6.40	74.7	72.2	74.7	135.8	76.0	91.2	100.3	67.1
13	65.8	59.7	64.6	5.80	94.2	72.2	74.7	135.8	76.0	91.2	85.5	67.1
14	65.8	60.9	64.6	5.80	97.2	72.2	74.7	135.8	76.0	91.2	85.5	67.1
15	65.8	60.9	64.6	5.20	97.2	72.2	74.7	135.8	76.0	91.2	85.5	69.6
16	65.8	60.9	64.6	6.40	97.2	72.2	76.0	135.8	76.0	91.2	85.5	70.9
17	65.8	60.9	64.6	5.80	97.2	72.2	76.0	135.8	76.0	91.2	85.5	69.6
18	65.8	62.1	64.6	5.80	69.6	72.2	74.7	135.8	76.0	91.2	86.9	68.4
19	65.8	62.1	64.6	5.80	69.6	72.2	74.7	135.8	76.0	91.2	72.3	69.6
20	64.6	62.1	80.0	5.20	82.6	72.2	76.0	135.8	76.0	91.2	72.3	68.4
21	65.8	62.1	74.7	5.20	82.6	72.2	76.0	129.2	77.3	91.2	69.6	67.1
22	64.6	62.1	74.7	5.20	80.0	72.2	76.0	129.2	76.0	91.2	65.9	67.1
23	63.4	63.4	64.6	5.20	82.6	80.0	80.0	129.2	76.0	91.2	65.9	67.1
24	64.6	62.1	67.1	4.10	82.6	80.0	77.3	124.3	77.3	91.2	65.9	67.1
25	64.6	62.1	14.3	4.10	80.0	80.0	77.3	124.3	76.0	91.2	65.9	67.1
26	59.7	62.1	8.80	5.20	80.0	74.7	77.3	124.3	76.0	91.2	65.9	67.1
27	59.7	62.1	6.40	3.55	80.0	74.7	76.0	144.3	76.0	89.8	70.9	67.1
28	59.7	60.9	6.40	3.55	77.3	74.7	77.3	144.3	76.0	89.8	72.2	67.1
29	59.7	.....	6.40	3.00	74.7	74.7	74.7	144.3	74.7	89.8	69.6	67.1
30	59.7	.....	6.40	3.00	72.2	77.3	74.7	144.3	74.7	89.8	65.9	67.1
31	60.9	.....	6.40	.....	72.2	.....	74.7	80.0	.....	88.3	.....	67.1
Mean	64.5	61.0	53.3	5.60	61.89	73.8	75.3	126.4	77.1	85.4	81.5	66.8

Mean Daily Flow in Second-feet Skaneateles Outlet at Willow Glen Weir—(Continued).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.
1898.												
1	67.1	64.6	65.9	72.2	80.0	73.4	72.2	72.2	72.2	69.6	68.4	72.2
2	67.1	64.6	65.8	70.9	80.0	73.4	72.2	72.2	72.2	69.6	68.4	69.6
3	65.9	64.6	65.8	69.6	97 2	73.4	72.2	72.2	72.2	69.6	68.4	69.6
4	65.9	64.6	65.8	69.6	82.7	73.4	72.2	72.2	72.2	69.6	68.4	69.6
5	65.9	64.6	65.8	70.9	78.7	73.4	69.6	72.2	72.2	69.6	68.4	74.7
6	67.1	64.6	65.8	72.2	80.0	73.4	69.6	72.2	72.2	69.6	69.6	69.6
7	67.1	64.6	65.8	69.6	68.4	72.2	69.6	72.2	74.7	68.4	69.6	69.6
8	67.1	64.6	67.1	69.6	68.4	72.2	69.6	72.2	77.3	68.4	68.4	69.6
9	67.1	64.6	67.1	69.6	67.1	70.9	69.6	72.2	72.2	68.4	68.4	69 6
10	67.1	67.1	67.1	69.6	67.1	70.9	73.4	72.2	72.2	67.1	91.2	69.6
11	67.1	69.6	67.1	69.6	78.7	70.9	73.4	72 2	72.2	69.6	82.8	69.6
12	67.1	80.0	68.4	69.6	89.8	74.7	73.4	72.2	72.2	69.6	72.2	69.6
13	67.1	74.7	74.7	69.6	80.0	72.2	73.4	72.2	72.2	69.6	72.2	69.6
14	68.4	74.7	69.6	69.6	69.6	70.9	73.4	72.2	72.2	72.2	72.2	69.6
15	68.4	67.1	68.4	69.6	65.8	70.9	74.7	72.2	72.2	74.7	69.6	69.6
16	68.4	64.6	68.4	69.6	65.8	70.9	74.7	72.2	72.2	68.4	69.6	69.6
17	69.6	64.6	68.4	69.6	65.8	70.9	73.4	72.2	72.2	68.4	69.6	72.2
18	69.6	67.1	68.4	69.6	65.8	70.9	73.4	72.2	72.2	68.4	69.6	74.7
19	72.2	67.1	72.2	69.6	65.8	70.9	73.4	72.2	69.6	68.4	72.2	74.7
20	77.3	69.6	74 7	72.2	72.2	70.9	73.4	72.2	69.6	68.4	80.0	76.0
21	78.7	69.6	72.2	72.2	76.0	69.6	73.4	72.2	69.6	74.7	74.7	77.3
22	69.6	68.4	69.6	72.2	76.0	69.6	73.4	72.2	69.6	85.5	74.7	77.3
23	72.2	67.1	74.7	74.7	76.0	69.6	73.4	73.4	69.6	88.3	74.7	77.3
24	69.6	67.1	72.2	82.8	76.0	69.6	73.4	72.2	72.2	85.5	72.2	74.7
25	69.6	67.1	72.2	80.0	74.7	69.6	73.4	72.2	72.2	85.5	72.2	74.7
26	69.6	67.1	70.9	68.4	76.0	69.6	73.4	72.2	72.2	88.3	72.2	73 4
27	69.6	67.1	69.6	68.4	77.3	69.6	73.4	72.2	72.2	88.3	72.2	72.2
28	69.6	67.1	72.2	68.4	74.7	69.6	73.4	72.2	72.2	72.2	69.6	72.2
29	68.4	.....	74.7	67.1	74.7	69.6	73.4	72.2	69.6	68.4	69.6	72.2
30	64.6	.....	74.7	67.1	74.7	72.2	73.4	72.2	69.6	68.4	69.6	74.7
31	64.6	.....	70.9	.....	73.4	.....	73.4	72.2	.....	68.4	.....	73.4
Mean	68.6	67.4	69.5	70.8	74.7	71.3	72.7	72.2	71.8	72.9	72.0	72.2
1899.												
1	76.0	72.2	72.2	72.2	72.2	77.3	74.7	69.6	64.6	64.6	64.6	59.7
2	74.7	69.6	77.3	72.2	77.3	80.0	74.7	69.6	64.6	62.1	62.1	59.7
3	80.0	69.6	77.3	72.2	72.2	77.3	72.2	69.6	64.6	60.9	60.9	59.7
4	80.0	67.1	77.3	72.2	67.1	77.3	72.2	69.6	64.6	59.7	62.1	59.7
5	77.3	64.6	77.3	72.2	67.1	77.3	72.2	69.6	64.6	59.7	62.1	59.7
6	74.7	64.6	74.7	74.7	67.1	77.3	72.2	69.6	64.6	59.7	59.7	59.7
7	72.2	64.6	69.6	77.3	67.1	76.0	72.2	69.6	64.6	59.7	59.7	59.7
8	73.4	67.1	64.6	77.3	67.1	74.7	74.7	69.6	64.6	62.1	59.7	59.7
9	73.4	64.6	65.8	80.0	67.1	74.7	77.3	69.6	64.6	62.1	59.7	59.7
10	73.4	64.6	64.6	74.7	67.1	74.7	72.2	69.6	64.6	62.1	59.7	59.7
11	73.4	64.6	67.1	72.2	67.1	76.7	69.6	69.6	64.6	60.9	59.7	59.7
12	74.7	64.6	69.6	85.5	74.7	76.0	69.6	69.6	64.6	60.9	59.7	*6.40
13	77.3	64.6	69.6	74.7	69.6	76.0	69.6	67.1	64.6	60.9	59.7	6.40
14	85.5	64.6	64.6	72.2	67.1	77.3	69.6	67.1	64.6	60.9	59.7	6.40
15	88.3	69.6	64.6	72.2	67.1	88.3	69.6	67.1	64.6	62.1	59.7	6.40
16	88.3	69.6	64.6	72.2	72.2	88.3	74.7	67.1	63.4	62.1	59.7	6.40
17	88.3	69.6	64.6	72.2	72.2	85.5	85.5	67.1	63.4	62.1	59.7	6.40
18	74.7	69.6	69.6	72.2	74.7	88.3	88.3	65.9	63.4	62.1	59.7	6.40
19	72.2	69.6	69.6	72.2	74.7	85.5	91.2	65.9	63.4	62.1	59.7	32.0
20	72.2	69.6	72.2	72.2	80.0	85.5	91.2	65.9	63.4	62.1	59.7	8 80
21	72.2	73.4	64.6	70.9	82.8	85.5	91.2	65.9	63.4	59.7	59.7	6.40
22	72.2	74.7	64.6	70.9	72.2	85.5	91.2	67.1	63.4	59.7	59.7	5.20
23	72.2	74.7	69.6	70.9	70.9	77.3	91.2	67.1	63.4	59.7	59.7	5.20
24	72.2	74.7	72.2	70.9	70.9	77.3	91.2	67.1	62.1	59.7	59.7	24.3
25	72.2	74.7	69.6	72.2	72.2	74.7	91.2	67.1	62.1	59.7	59.7	8.80
26	74.7	74.7	69.6	122.7	72.2	74.7	91.2	67.1	64.6	59.7	59.7	8.80
27	74.7	69.6	69.6	94.2	77.3	74.7	91.2	67.1	62.1	59.7	59.7	7.60
28	72.2	69.6	69.6	80.0	80.0	74.7	91.2	67.1	62.1	59.7	59.7	7.60
29	72.2	.....	69.6	70.9	74.7	74.7	69.6	64.6	64.6	59.7	59.7	7.60
30	72.2	.....	72.2	72.2	78.7	74.7	69.6	64.6	64.6	59.7	59.7	7.60
31	72.2	.....	74.7	.....	77.3	.....	69.6	64.6	.....	62.1	.....	7.00
Mean	75.5	68.9	69.7	76.0	72.3	78.9	79.1	67.7	64.1	60.9	60.1	27.0

*Reservoir closed.

***Mean Daily Flow in Second-feet. Skaneateles Outlet at Willow Glen Weir*—(Continued).**

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1..........	6.40	24.3	20.7	11 50	6.40	33.0	36.1	69.6	68.4	64.6	85.5	77.3
2..........	6.40	24.3	17.40	11.50	6.40	33.0	36.1	69.6	68.4	119.4	82.8	77.3
3..........	6.40	24.3	17.40	11.50	6 40	34.0	36.1	69.6	69.6	119.4	82.8	74.7
4..........	20.7	24 3	14.30	11.50	5.20	34.0	35.1	69.6	69.6	119.4	82.8	74.7
5..........	6.40	24 3	14.30	11.50	5.20	34.0	35.1	69.6	70.8	119.4	82 8	88.3
6..........	8.80	24 3	17.40	11 50	5.20	34.0	35.1	69.6	70.8	119.4	82.8	85.5
7..........	11.50	30 0	17.40	11.50	5.20	34.0	35.1	69.6	70.8	119.4	82 8	80.0
8..........	20.7	30.0	17.40	8.80	6.40	34.0	36.1	69.6	70.8	119.4	82.8	77.3
9..........	82.8	30.0	17.40	8.80	6.40	34.0	36.1	69.6	70.8	91.2	82.8	74.7
10..........	20.7	30.0	17.40	7.60	6.40	34.0	36.1	69.6	69.6	91.2	82.8	74.7
11..........	14.30	30.0	11.50	8.80	17.40	32.0	36.1	69.6	69.6	88.3	82 8	36.1
12..........	8.80	30.0	11.50	8.80	17.40	26.2	36 1	69.6	69.6	85.5	82.8	36.1
13..........	8.80	30.0	11.50	8.80	20.70	35.1	36.1	69.6	67.1	85.5	80.0	36.1
14..........	8.80	30.0	11.50	8.80	17.40	35.1	36.1	69.6	67.1	88.3	80.0	36.1
15..........	10.1	30.0	11.50	8.80	14.30	34.0	36.1	69.6	67.1	88.3	80.0	36.1
16..........	14.30	30.0	11.50	8.80	14.30	34.0	36.1	69.6	67.1	88.3	78.7	36.1
17..........	11.50	30.0	11.50	8.80	14 30	36.1	38.3	68.4	67.1	88.3	78.7	36.1
18..........	14.30	30.0	11.50	8.80	14.30	36.1	38.3	68.4	67.1	88.3	78.7	36.1
19..........	17.40	30.0	14.30	8.80	15.1	35.1	38.3	69.6	67.1	86.9	78.7	36.1
20..........	36.10	30 0	20.70	8.80	14.30	35.1	36.1	68.5	67.1	86.9	78.7	37.2
21..........	20.7	30.0	20.70	8.80	14.30	34.0	36.1	68.5	64.6	85.5	78.7	38.3
22..........	17.40	30.0	14.30	10.1	35.1	34.0	34 0	68.5	64.6	85.5	78.7	38.3
23..........	11.50	30.0	11.50	8.80	35.1	34.0	80.0	68.5	64.6	85.5	78.7	40.5
24..........	11.50	30.0	11.50	8.80	35.1	34.0	69.6	68.5	64.6	85.5	78.7	40.5
25..........	14.30	30.0	17.40	7.60	35.1	36.1	72.2	68.5	64.6	85.5	80.0	40.5
26..........	20.7	30.0	11.50	7.60	35 1	36.1	69.6	68.5	64.6	85.5	116.2	37.2
27..........	17.40	30.0	11.50	7.60	35.1	36.1	69.6	68.5	64.6	85.5	85.5	36.1
28..........	14.30	30.0	11.50	6.40	34.0	36.1	69.6	68.5	64.6	85.5	85.5	36 1
29..........	11.50	.....	14.30	6.40	33.0	36.1	69.6	68.5	64.6	85.5	92.7	36.1
30..........	11.50	.....	14.30	6.40	33.0	36.1	69.6	68.5	64.6	85.5	77.3	36.1
31..........	11.50	.....	14.30	......	33.0	.....	69.6	68.5	.....	85.5	.....	36.1
Mean....	16.0	28.7	14.5	9.07	18 6	34.2	46.3	69.1	67.4	93.5	82.7	50.4
1901.												
1..........	36.1	32.0	32.0	36.1	135.8	97.2	203.5	97.2	85.5	82.8	103.4	103.4
2..........	36.1	32.0	32.0	36.1	132.5	129.2	203.5	97.2	85.5	82.8	103.4	122.7
3..........	36.1	32.0	32.0	54.8	129.2	129.2	203.5	97.2	85.5	82.8	103.4	80.0
4..........	36.1	32.0	32.0	45.1	142.5	135.8	203 5	97.2	86.5	82.8	103.4	80.0
5..........	36.1	32.0	32.0	54.8	146.0	142.5	149.5	97.2	85.5	82.8	103.4	80.0
6..........	36.1	32.0	32 0	59.7	146.0	142.5	149.5	97.2	85.5	82.8	103.4	80.0
7..........	36.1	32.0	32.0	40.5	132.5	171.2	149.5	97.2	85.5	82.8	104.4	80.0
8..........	36.1	32.0	32.0	54.8	132.5	171.2	149.5	97.2	82.8	82.8	103.4	80.0
9..........	40.5	32.0	32.0	49.9	132.5	175.0	149.5	97.2	82.8	82.8	103.4	80.0
10..........	40.5	32.0	36.1	97.2	135.8	175.0	129.2	97.2	82.8	80.0	103.4	80.0
11..........	41.7	32.0	54.8	97.2	135.8	175.0	129.2	94.2	82.8	80.0	103.4	80.0
12..........	49.9	32.0	49.9	97.2	135.8	175.0	129.2	94.2	82.8	80.0	103.4	80.0
13..........	42.8	32.0	40.5	97.2	129.2	175.0	129.2	94.2	82.8	80.0	103.4	80.0
14..........	38.3	32.0	40.5	91.2	129.2	175.0	109.8	94.2	82.8	80.0	103.4	103.4
15..........	36.1	32.0	40.5	91.2	129.2	175.0	109.8	94.2	82.8	80.0	103.4	106.6
16..........	36.1	32.0	40.5	91.2	129.2	175.0	109.8	94.3	82.8	109.8	103.4	109.8
17..........	36.1	32.0	40 5	91.2	129.2	175.0	109.8	94.2	82.8	129.2	103.4	80.0
18..........	36.1	32.0	36.1	91.2	103.4	175.0	109.8	94.2	82.8	129.2	103.4	80.0
19..........	36.1	32.0	36.1	91.2	109.8	175.0	109.8	94.2	82.8	129.2	103.4	80.0
20..........	34.0	32.0	54.8	103.4	109.8	178.9	109.8	94.2	82.8	129.2	103.4	80.0
21..........	36.1	32.0	116.2	103.4	109.8	187.0	109.8	100.3	82.8	129.2	103.4	80.0
22..........	34.0	32.0	45.1	103.4	109.8	195.6	109.8	97.2	82.8	129.2	103.4	80.0
23..........	33.0	32.0	40.5	103.4	109.8	203.5	109.8	97.2	82.8	129.2	103.4	72.2
24..........	32.0	32.0	45.1	116.2	109.8	203.5	109.8	97.2	82.8	103.4	103.4	72.2
25..........	32.0	32.0	45.1	116.2	103.4	203.5	109.8	97.2	82.8	103.4	103.4	72.2
26..........	32.0	32.0	54.8	122.7	91.2	203.5	94.2	94.2	82.8	103.4	103.4	72.2
27..........	32.0	32.0	69.6	129.2	91.2	203.5	94.2	.....	82.8	103.4	103.4	72.2
28..........	32.0	32.0	49.9	129 2	94.2	203.5	97.2	94.2	82.8	103.4	103.4	72.2
29..........	32.0	.....	36.1	129.2	97 2	203.5	97.2	94.2	82.8	103.4	103.4	72.2
30..........	32.0	.....	36.1	129.2	94.2	203.5	97.2	92.7	82.8	103.4	103.4	72.2
31..........	32.0	.....	40.5	......	97.2	203.5	97.2	85.5	.....	103.4	.....	72.2
Mean....	36.0	32.0	43.1	88.4	119.7	175.3	128.2	95.4	83.4	98.9	103.4	82.4

Mean Daily Flow in Second-feet, Skaneateles Outlet at Willow Glen Weir.—(Concluded).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	72.2	69.6	91.2	74.7	74.7	74.7	80.0	132.5	156.6	129.2	116.2	91.2
2	72.2	69.6	91.2	74.7	74.7	74.7	77.3	135.8	116.2	129.2	116.2	91.2
3	72.2	69.6	91.2	74.7	74.7	77.3	85.5	135.8	116.2	116.2	116.2	91.2
4	72.2	69.6	80.0	74.7	74.7	80.0	80.0	135.8	116.2	116.2	116.2	91.2
5	72.2	69.6	80.0	74.7	74.7	77.3	85.5	135 8	116.2	116.2	116.2	91.2
6	72.2	69.6	80.0	74.7	74.7	74.7	85.5	135.8	116.2	116.2	116.2	91.2
7	72.2	69.6	74.7	74.7	74.7	77.3	80.0	135.8	116.2	116.2	116.2	91.2
8	72.2	69.6	74.7	77.3	74.7	80.0	85.5	135 8	116.2	116.2	116.2	91.2
9	72.2	69.6	80.0	77.3	74.7	77.3	85.5	139.1	116.2	116.2	116.2	91.2
10	72.2	69.6	74.7	80.0	74.7	74.7	91.2	135.8	116.2	116.2	116.2	91.2
11	72.2	69.6	74.7	74.7	74.7	77.3	91.2	135.8	116.2	116.2	116 2	91.2
12	72.2	69.6	77.3	74.7	74.7	74.7	91.2	156.6	116.2	116.2	116.2	91.2
13	72.2	69.6	77.3	74.7	74.7	77.3	94.2	156.6	116.2	116.2	116.2	91.2
14	72.2	69.6	74.7	74.7	74.7	91.2	94.2	156.6	116.2	116.2	116.2	91.2
15	72.2	69.6	74.7	74.7	74.7	80.0	94.2	156.6	116.2	116.2	116.2	80.0
16	72.2	69.6	74.7	74.7	74.7	80.0	94.2	156.6	135 8	116.2	116.2	80.0
17	72.2	69.6	74.7	74.7	74.7	74.7	94.2	156.6	135.8	116.2	116.2	80.0
18	72.2	69.6	74.7	74.7	74.7	74.7	94.2	156.6	160.2	116 2	116.2	80 0
19	72.2	69.6	74.7	74.7	74.7	74.7	97.2	156.6	160.2	116.2	116.2	80.0
20	69.6	69.6	74.7	74.7	74.7	74.7	97.2	156.6	160.2	116.2	116.2	80.0
21	69.6	69.6	74.7	74.7	74.7	74.7	116.2	156.0	129.2	116.2	116.2	80.0
22	69.6	69.6	74.7	74.7	74.7	77.3	116.2	156.6	129.2	116.2	116.2	80.0
23	69.6	69.6	74.7	74.7	74.7	77.3	116.2	156.6	129.2	116.2	116.2	80.0
24	69.6	69.6	74.7	74.7	74.7	77.3	116.2	156.6	129.2	116.2	116.2	80.0
25	69.6	69.6	74.7	74.7	74.7	80.0	116.2	156.6	129.2	116.2	116.2	80.0
26	69.6	69.6	74.7	74.7	74.7	80.0	116.2	156.6	129.2	116.2	116.2	80.0
27	69.6	80.0	74.7	74.7	80.0	77.3	116.2	156.6	129.2	116.2	91.2	80.0
28	69.6	85.5	74.7	74.7	77.3	77.3	129.2	156.6	129.2	116.2	91.2	80.0
29	69.6	.....	74.7	74.7	74.7	77.3	129.2	156.6	129.2	116.2	91.2	80.0
30	69.6	.....	74.7	74.7	74.7	85.5	129.2	156.6	129.2	116.2	91.2	80.0
31	69.6	.....	74.7	.....	74.7	.....	129.2	156.6	.....	116.2	.....	80.0
Mean	70.8	70.5	77.1	75.0	75.0	77.7	100.2	149.2	127.5	117.0	112.2	85.0

Mean Monthly Run-off of Skaneateles Outlet, Jordan, Onondaga Co., N. Y.

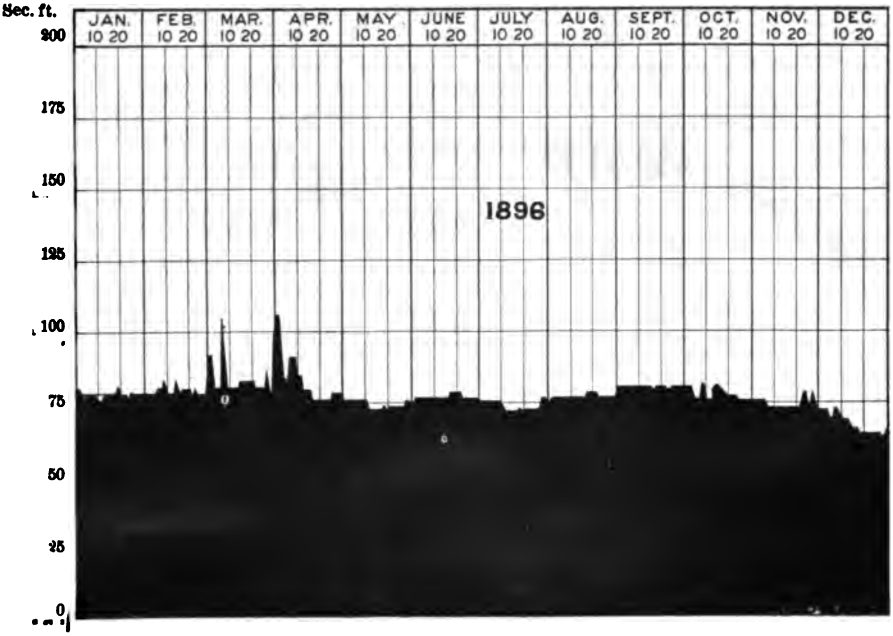
[Drainage area, 93 square miles.]

MEAN MONTHLY FLOW IN SECOND-FEET.

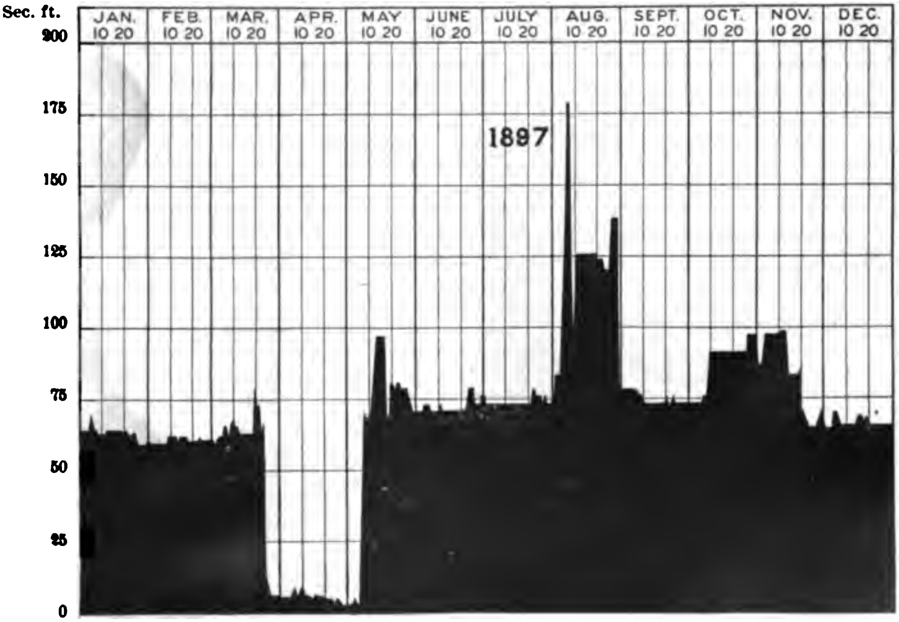
MONTH.	1890.	1891.	1892.
January	......	......	......
February	......	......	......
March	......	......	......
April	......	......	......
May	......	......	......
June	......	127.8	......
July	......	115.3	......
August	......	153.1	128.5
September	156.6	146.6	116.5
October	153 9	148.7	121 2
November	155.2	......	114.6
December	161.5	......	......

SECOND-FEET PER SQUARE MILE.

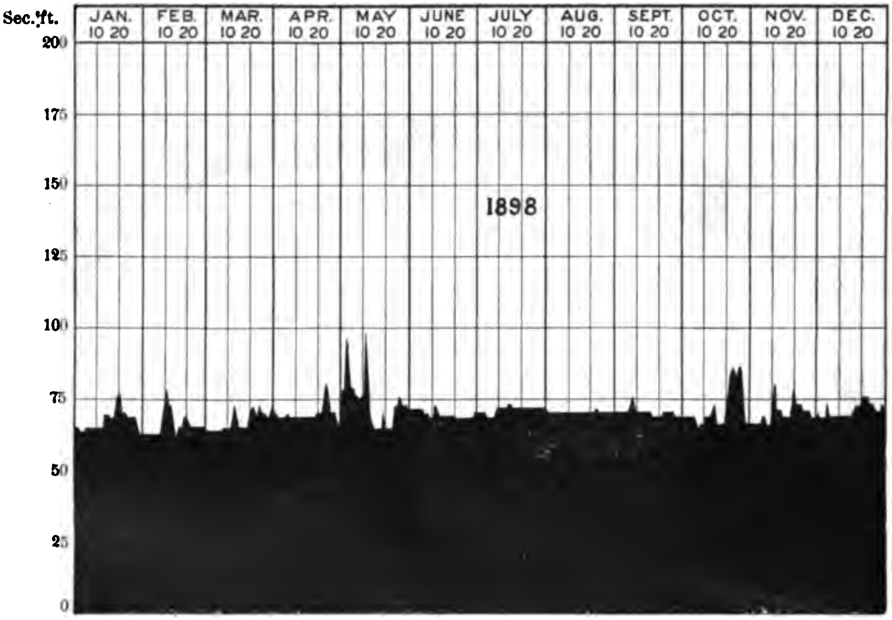
MONTH.	1890.	1891.	1892.
January	......	......	......
February	......	......	......
March	......	......	......
April	......	......	......
May	......	......	......
June	......	1 38	......
July	......	1.24	......
August	......	1.65	1.39
September	1.70	1.59	1.26
October	1.66	1.61	1.31
November	1.67	......	1.24
December	1.75	......	......



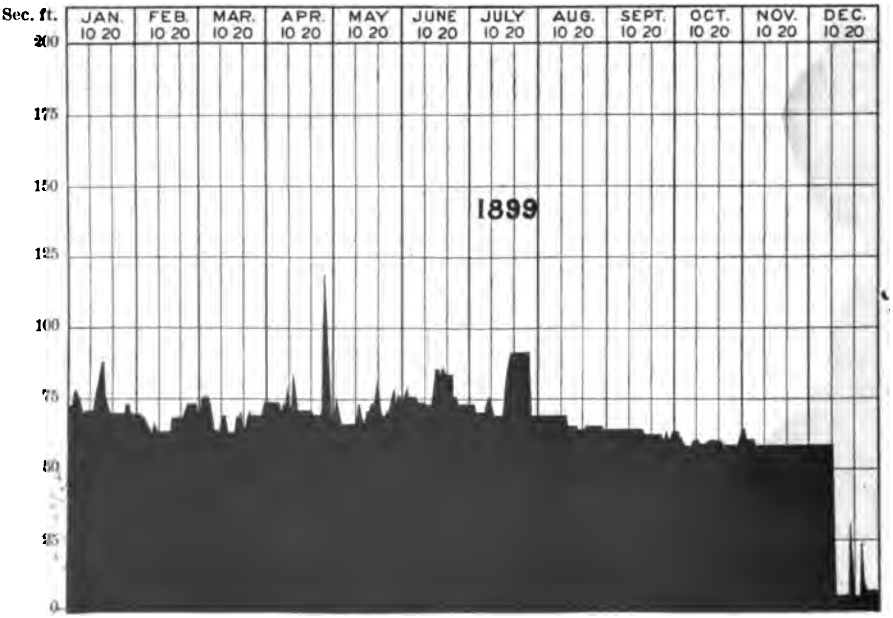
Discharge of Skaneateles Lake Outlet at Willow Glen Weir, Onondaga County, N. Y., 1896.



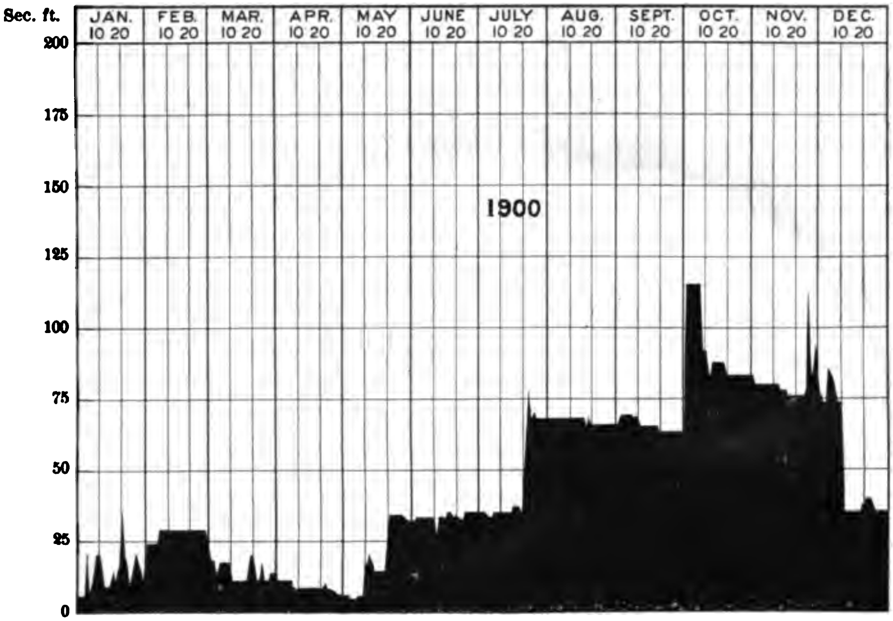
Discharge of Skaneateles Lake Outlet at Willow Glen Weir, Onondaga County, N. Y., 1897.



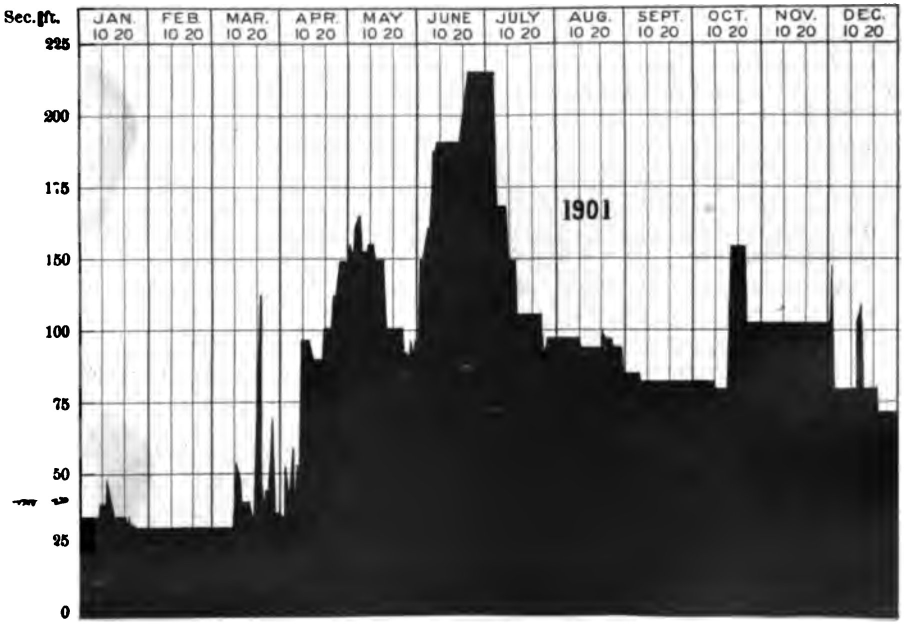
Discharge of Skaneateles Lake Outlet at Willow Glen Weir, Onondaga County, N. Y., 1898.



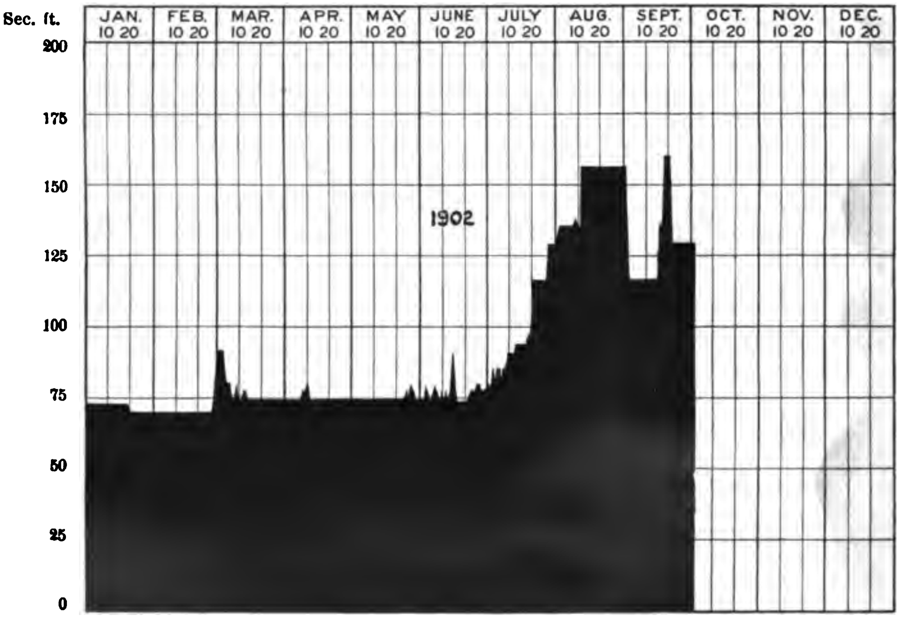
Discharge of Skaneateles Lake Outlet at Willow Glen Weir, Onondaga County, N. Y., 1899.



Discharge of Skaneateles Lake Outlet at Willow Glen Weir, Onondaga County, N.Y., 1900.



Discharge of Skaneateles Lake Outlet at Willow Glen Weir, Onondaga County, N. Y., 1901.



Discharge of Skaneateles Lake Outlet at Willow Glen Weir, Onondaga County, N. Y., 1902.

***Mean Monthly Run-off of Skaneateles Outlet, Jordan, Onondaga Co., N. Y.*—(Concluded).**

INCHES ON DRAINAGE AREA.

MONTH.	1890.	1891.	1892.
January	......	......	....
February	......	......	....
March	......	......	....
April	......	......	....
May	......	......	....
June	......	1.55	....
July	......	1.43	....
August	......	1.89	1.59
September	1.90	1.78	1.41
October	1.91	1.85	1.51
November	1.87	......	1.39
December	2.01	......	....

Willow Glen Weir below Skaneateles, N. Y. Actual Run-off of Outlet in Second-feet.

[Drainage area, 74 square miles.]

MONTH.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
January	......	80.0	64.5	68.6	75.5	16.0	36.0	70.8
February	......	82.5	61.0	67.4	68.9	28.7	32.0	70.5
March	87.2	89.1	53.3	69.5	69.7	14.5	43.1	77.1
April	145.7	83.4	5.6	70.8	76.0	9.07	88.4	75.0
May	110.7	84.3	61.9	74.7	72.3	18.6	119.7	75.0
June	84.0	83.1	73.8	71.3	78.9	34.2	175.3	77.7
July	89.7	76.3	75.3	72.7	79.1	46.3	128.2	100.2
August	97.8	78.8	126.4	72.2	67.7	69.1	95.4	119.2
September	97.2	83.5	77.1	71.8	64.1	67.4	83.4	127.5
October	99.2	79.4	85.4	72.9	60.9	93.5	98.9	117.0
November	97.3	76.2	81.5	72.0	60.1	82.7	103.4	112.2
December	84.1	68.6	66.8	72.2	27.0	50.4	82.4	85.0

Total Run-off of Skaneateles Outlet at Willow Glen Weir, in Second-feet.*

[Drainage area, 74 square miles.]

MONTH.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
January	......	93.0	76.8	81.6	90.8	30.7	53.8	88.6
February	......	95.5	73.5	79.9	84.6	44.5	49.4	88.5
March	103.2	101.6	65.5	82.2	84.7	30.3	60.5	90.1
April	162.0	95.2	16.9	83.0	91.5	26.8	106.4	94.5
May	127.0	97.0	74.3	86.2	86.8	34.7	138.1	94.5
June	102.1	102.2	85.1	84.2	94.4	52.3	194.8	95.5
July	107.8	91.1	88.9	88.2	94.8	64.0	142.6	119.2
August	114.5	92.2	138.4	86.6	84.6	88.2	114.0	168.5
September	112.3	96.4	89.4	85.5	80.5	85.7	101.6	146.6
October	113.9	91.2	97.4	87.1	76.4	111.2	117.3	....
November	111.2	87.3	93.3	85.5	75.4	99.4	121.2	....
December	96.7	82.8	79.1	85.5	42.5	66.8	100.3	....

*Including diversion for water supply of Syracuse.

*Mean Monthly Run-off of Skaneateles Outlet at Willow Glen Weir in Second-feet per Square Mile.**

[Drainage area, 74 square miles.]

MONTH.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
January	......	1.25	1.04	1.10	1.23	.41	.73	1.20
February	......	1.29	.99	1.08	1.14	.60	.67	1.19
March	1.39	1.38	.88	1.11	1.14	.41	.82	1.30
April	2.18	1.28	.23	1.12	1.24	.36	1.43	1.28
May	1.71	1.31	1.00	1.16	1.17	.47	1.86	1.28
June	1.37	1.38	1.15	1.14	1.27	.71	2.63	1.29
July	1.46	1.23	1.20	1.19	1.28	.87	1.93	1.67
August	1.55	1.24	1.86	1.17	1.14	1.19	1.54	2.28
September	1.51	1.30	1.21	1.15	1.09	1.16	1.38	1.98
October	1.54	1.23	1.31	1.18	1.03	1.49	1.58	....
November	1.49	1.18	1.24	1.15	1.02	1.34	1.63	....
December	1.31	1.12	1.07	1.15	0.57	.91	1.35	....

*Including diversion for water supply of Syracuse.

*Mean Monthly Run-off of Skaneateles Outlet at Willow Glen Weir in Inches on Drainage Area.**

[Drainage area, 74 square miles.]

MONTH.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
January	......	1.44	1.19	1.27	1.41	.47	.84	1.38
February	......	1.39	1.03	1.12	1.19	.62	.69	1.24
March	1.59	1.59	1.01	1.28	1.31	.47	.94	1.50
April	2.44	1.43	.26	1.25	1.39	.40	1.60	1.43
May	1.97	1.51	1.15	1.33	1.35	.54	2.14	1.48
June	1.53	1.55	1.29	1.28	1.42	.79	2.95	1.44
July	1.68	1.41	1.38	1.36	1.47	1.00	2.22	1.93
August	1.78	1.43	2.14	1.35	1.31	1.37	1.78	2.63
September	1.69	1.46	1.35	1.29	1.22	1.30	1.54	2.21
October	1.77	1.41	1.51	1.36	1.18	1.71	1.82	....
November	1.67	1.32	1.39	1.29	1.14	1.50	1.82	....
December	1.51	1.29	1.23	1.32	0.66	1.05	1.56	....
Total	17.63	17.23	14.93	15.50	15.05	11.22	19.90	15.24

*Including diversion for water supply of Syracuse.

Mean Monthly Run-off of Skaneateles Lake at State Dam, Skaneateles, Onondaga Co,, N. Y.

[Drainage area, 73 square miles.]

MONTH.	SECOND-FEET.		SECOND-FEET PER SQUARE MILE.		INCHES ON DRAINAGE AREA.	
	1890.	1891.	1890.	1891.	1890.	1891.
January	....	102.9	....	1.43	....	1.64
February	....	115.2	....	1.58	....	1.64
March	....	182.7	....	2.51	....	2.89
April	....	186.6	....	2.56	....	2.87
May	....	116.4	....	1.59	....	1.83
June	....	96.4	....	1.32	....	1.48
July	....	94.9	....	1.30	....	1.49
August	....	....	....	....	....	....
September	117.8	....	1.62	....	1.81	....
October	100.88	....	1.38	....	1.59	....
November	107.5	....	1.48	....	1.66	....
December	113.4	....	1.55	....	1.78	....

SENECA RIVER AT BALDWINSVILLE, ONONDAGA COUNTY, N. Y.

This gauging station has been described in Water Supply and Irrigation Paper No. 36, page 183. Seneca River drains the central lake region of New York. The outlets of Otisco, Skaneateles and Owasco Lakes are crossed by the Erie canal, and a portion of their flow is intercepted for water supply purposes. Water from Lake Erie feeds the main canal as far as Port Byron. Some of this water is discharged into Seneca River and thence returned through the Oswego River to Lake Ontario.

The upper reaches of the stream are canalized, forming the Cayuga and Seneca canals, while dams on the lower portion admit of slackwater navigation, forming a part of Oswego canal. During the summer but little water flows over the dam at Baldwinsville. In times of low water, the mills are only allowed to run a certain number of hours during the day, or until the supply accumulated in the pond above the dam is drawn down to a certain level.

The water is diverted through three power canals and conducted to the water wheels by means of short lateral channels. Power is used at ten mills having a total of over 40 water wheels.

Current meter measurements at Baldwinsville have been made as follows:

DATE.	Discharge, second-feet.
June 11, 1900:	
Oswego canal [a]	504.5
Main stream at railroad bridge	1,183
Total flow	1,688
Flow in Amos race on same date	194
September 11, 1900 (no water flowing over dam):	
South side canal	475
Oswego canal	317
Amos race	127
Total flow	919

[a] Including South Side canal and Amos race.

Owing to leakage of water wheels and penstocks, great difficulty is experienced in securing accurate results during low water at Baldwinsville. The stream has been examined at various other points with reference to the possible establishment of a current meter station, and the following current meter measurements have been made:

Seneca River at Belgium (New Bridge), N. Y.

DATE.	Measured discharge, second-feet.
May 23, 1901	5,279
June 6, 1901	5,014

Seneca River at Jack's Reef bridge, September 11, 1901:

Discharge at Jack's Reef bridge	1,651	second-feet.
Discharge in "cut off"	83	second-feet.
Total flow	1,734	second-feet.

Owing to slackwater in the channels, backwater from dams below, and other causes, it has been found that the above stations could not be utilized at all stages of the stream. During 1901, repairs have been made to the penstocks, water wheels, etc., at a number of the Baldwinsville mills, greatly reducing the leakage, and the record at that station has been continued.

Mean Monthly Run-off of Seneca River at Baldwinsville, Onondaga Co., N. Y.

[Drainage area, 3,103 square miles.]

MEAN MONTHLY FLOW IN SECOND FEET.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	2,851	2,150	2,630	3,279
February	......	1,769	3,129	1,930	2,341
March	......	3,875	4,441	4,049	8,375
April	......	4,543	6,845	8,951	5,056
May	......	2,568	3,120	5,545	2,799
June	......	1,573	1,508	4,272	2,264
July	......	776	720	2,024	2,864
August	......	455	551	2,099	3,114
September	......	481	471	1,776	1,848
October	......	637	1,063	1,892	2,210
November	3,142	1,612	1,498	2,071	2,539
December	2,689	1,722	4,126	3,387	2,252

Mean Monthly Run-off of Seneca River at Baldwinsville, Onondaga Co., N. Y.—(Concluded).

SECOND-FEET PER SQUARE MILE.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	0.92	.69	.85	1.06
February	......	0.57	1.01	.62	.75
March	......	1.25	1.43	1.30	2.70
April	......	1.46	2.21	2.88	1.63
May	......	0.83	1.00	1.79	.90
June	......	0.51	.48	1.37	.73
July	......	0.22	.23	.65	.92
August	......	0.15	.18	.68	1.00
September	......	0.15	.15	.57	.60
October	......	0.20	.34	.61	.71
November	1.01	0.52	.48	.66	.82
December	0.87	0.55	1.33	1.09	.72

INCHES ON DRAINAGE AREA.

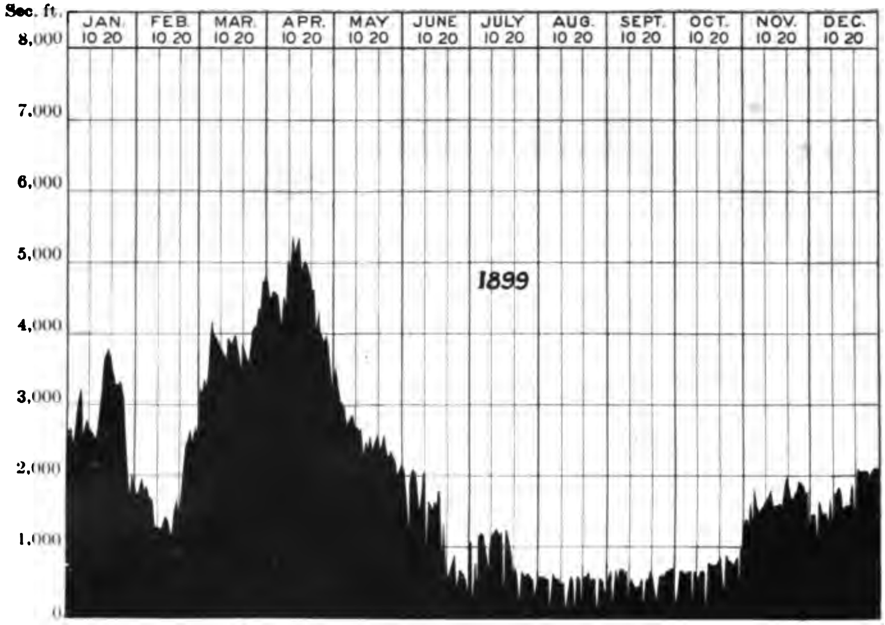
MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	1.06	.79	.98	1.22
February	......	0.59	1.05	.64	.78
March	......	1.44	1.65	1.50	3.11
April	......	1.63	2.47	3.21	1.82
May	......	0.95	1.15	2.06	1.04
June	......	0.57	.54	1.53	.81
July	......	0.25	.26	.75	1.00
August	......	0.17	.21	.78	1.15
September	......	0.17	.17	.63	.67
October	......	0.24	.39	.70	.82
November	1.15	0.58	.54	.73	.91
December	1.00	0.63	1.53	1.26	.83

Mean Daily Flow in Second-feet of Seneca River at Baldwinsville, Onondaga Co., N. Y.
[Drainage area, 3,103 square miles.]

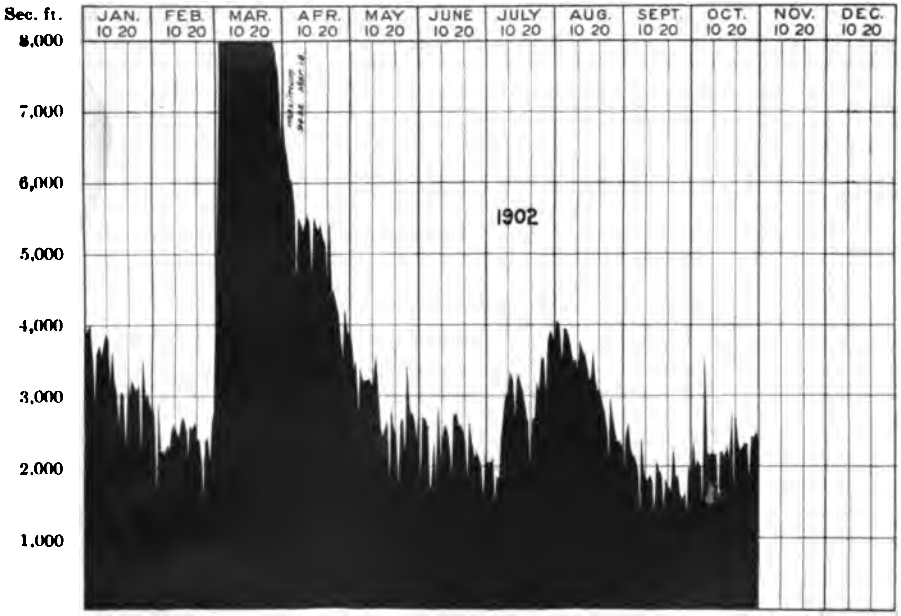
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,528
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,512
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,609
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,579
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,889
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,715
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,981
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,687
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,467
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,389
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,872
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,011	2,219
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,625	2,078
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,583	2,056
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,684	1,982
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,500	2,111
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,418	2,271
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,270	1,551
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,308	2,151
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,590	2,292
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,293	2,418
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,174	2,927
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,234	3,455
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,236	3,838
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,257	3,661
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,245	3,630
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,452	3,368
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,119	3,449
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,810	3,191
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,801	3,326
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,365
Mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,142	2,689

Mean Daily Flow in Second-feet of Seneca River at Baldwinsville, Onondaga Co., N. Y.—(Continued.)

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1	2,630	1,838	3,232	4,599	3,406	2,073	1,067	585	570	134	1,328	1,415
2	2,686	1,791	3,172	4,495	3,521	1,692	156	572	630	658	1,386	1,454
3	2,454	1,953	3,352	4,606	3,230	1,132	771	560	112	650	1,220	1,050
4	2,547	1,794	3,249	4,567	3,032	1,884	163	540	650	608	1,592	1,631
5	2,993	1,835	3,468	4,520	3,007	2,085	1,141	532	505	615	1,270	1,496
6	3,202	1,793	3,855	4,329	2,906	2,058	1,185	70	670	610	1,793	1,450
7	2,977	1,676	4,190	4,072	2,692	1,859	1,142	621	671	653	1,543	1,455
8	2,543	1,653	3,992	4,509	2,799	1,467	825	533	591	70	1,462	1,330
9	2,779	1,293	3,943	4,394	2,862	1,713	678	532	623	635	1,516	1,650
10	2,696	1,267	3,838	5,019	2,705	2,038	1,103	499	158	550	1,597	1,306
11	2,645	1,267	3,783	4,955	2,662	834	1,188	475	521	525	1,631	1,742
12	2,554	1,241	3,623	5,347	2,614	1,631	1,215	491	490	624	1,708	1,759
13	2,535	1,340	3,915	5,181	2,637	1,541	1,258	74	422	646	1,786	1,828
14	2,577	1,419	3,860	5,218	2,302	1,526	1,182	339	409	629	1,527	1,724
15	2,950	1,380	3,860	5,327	2,477	1,608	1,207	575	437	74	1,544	1,501
16	3,186	1,101	3,978	4,874	2,398	4,581	174	521	513	787	1,545	1,533
17	3,628	1,226	3,872	4,939	2,534	1,797	1,226	99	70	765	1,599	1,565
18	3,708	1,502	3,678	5,033	2,355	789	1,155	571	514	765	1,518	1,565
19	3,769	1,652	3,413	4,981	2,415	1,303	922	545	508	765	1,742	1,878
20	3,645	1,494	3,821	4,791	2,536	569	574	70	623	781	1,966	1,470
21	3,469	1,685	3,525	4,606	2,302	583	712	580	488	834	1,712	1,960
22	3,272	2,056	3,563	4,620	2,576	646	543	596	397	301	1,670	2,096
23	3,298	2,403	3,755	4,040	2,309	750	206	614	177	875	1,739	2,045
24	3,310	2,488	4,021	4,311	2,257	895	656	502	562	798	1,757	2,050
25	3,209	2,646	4,091	4,026	2,334	386	585	548	573	787	1,904	2,050
26	3,095	2,482	4,093	3,992	2,296	668	593	529	561	725	1,891	2,055
27	2,358	2,668	4,348	3,883	2,209	625	613	70	643	794	1,879	1,978
28	2,093	2,584	4,278	3,975	1,962	588	586	555	643	822	1,711	2,039
29	1,662	.....	4,776	3,853	2,045	543	531	522	691	351	1,728	2,091
30	2,028	.....	4,702	3,216	2,066	328	238	395	.....	947	1,087	2,089
31	1,871	.....	4,782	.....	2,192	.....	467	375	.....	971	.....	2,089
Mean	2,851	1,769	3,875	4,543	2,568	1,573	776	455	481	637	1,612	1,722
1900.												
1	1,318	2,202	3,576	7,296	3,041	2,491	237	758	584	724	1,435	4,265
2	1,454	2,186	3,890	8,080	4,709	2,478	1,189	873	199	712	1,376	3,296
3	1,552	1,791	3,948	8,334	4,504	2,089	1,208	805	585	647	1,269	4,591
4	1,655	2,128	3,729	8,630	4,464	2,433	557	779	555	683	1,177	4,434
5	1,645	2,059	3,856	8,533	4,418	3,640	1,090	257	536	764	1,658	4,807
6	1,658	2,217	3,692	8,595	3,669	2,202	1,073	828	527	859	1,314	4,807
7	404	1,871	3,623	8,477	3,874	2,175	927	808	531	345	1,274	4,961
8	1,579	1,601	3,666	8,086	4,033	2,111	199	803	514	871	1,097	4,943
9	1,589	2,788	3,658	8,275	3,951	2,433	867	783	199	795	2,016	4,116
10	1,587	2,860	3,861	7,969	3,923	974	824	444	456	887	1,053	4,921
11	1,580	2,893	3,542	7,690	3,639	1,534	784	768	437	881	441	4,954
12	1,693	3,271	3,835	7,529	3,661	1,528	729	257	454	781	1,353	4,348
13	1,720	4,376	3,790	7,396	3,023	1,570	725	716	552	877	1,267	4,654
14	1,547	4,704	3,727	6,988	3,658	1,530	739	714	519	320	1,288	4,286
15	1,759	4,743	3,792	6,746	3,583	1,550	199	403	519	1,034	1,294	4,170
16	1,597	4,879	3,712	6,725	3,513	1,431	763	717	199	991	1,262	3,326
17	1,640	4,117	3,530	6,598	3,409	704	1,023	738	567	1,010	1,202	4,004
18	1,759	3,473	3,325	6,503	3,220	1,063	991	717	553	966	234	4,034
19	1,906	3,425	3,623	6,339	3,056	1,122	992	208	555	1,068	1,295	4,133
20	2,470	3,332	3,706	5,895	2,213	1,130	829	559	506	1,054	1,333	4,043
21	3,352	3,584	4,099	5,513	2,970	978	563	236	537	320	1,289	4,198
22	3,795	3,307	4,422	6,005	2,868	963	199	624	488	1,231	1,341	4,064
23	3,870	3,521	3,947	5,834	2,666	944	738	429	190	1,179	1,422	2,976
24	3,835	3,709	4,786	5,454	2,677	264	703	456	472	1,192	1,190	4,014
25	3,803	3,607	4,945	5,509	2,717	912	667	493	510	1,186	692	3,434
26	3,470	1,573	5,437	5,509	2,767	948	675	237	554	1,062	1,777	4,111
27	1,500	3,568	5,674	5,248	1,993	960	562	529	525	1,240	2,554	4,010
28	2,596	3,826	5,763	4,941	2,688	1,115	679	570	544	517	3,109	3,908
29	2,997	....	6,238	4,814	2,553	1,050	199	567	533	1,547	3,136	3,763
30	2,701	.....	10868	5,705	2,406	1,111	682	605	245	1,603	3,784	2,952
31	2,618	.....	7,501	.....	3,045	.....	714	605	.....	1,687	.....	3,390
Mean	2,150	3,129	4,441	6,845	3,320	1,508	720	551	471	1,063	1,498	4,126



Discharge of Seneca River at Baldwinsville Onondaga County, N. Y., 1899.



Discharge of Seneca River at Baldwinsville, Onondaga County, N. Y., 1902.

Mean Daily Flow in Second-feet of Seneca River at Baldwinsville, Onondaga Co., N. Y.—(Concluded.)

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	2,141	2,281	2,072	8,412	8,790	3,965	3,532	1,735	321	1,981	2,119	1,990
2	3,361	2,159	1,937	8,192	8,670	3,101	3,404	1,640	1,868	1,955	1,966	2,289
3	2,498	1,705	1,694	8,166	8,532	4,511	3,208	1,491	1,910	1,865	1,127	2,587
4	2,253	2,311	2,189	8,357	8,004	4,535	3,123	917	2,171	2,122	2,124	2,378
5	2,168	2,009	2,176	8,507	6,728	4,482	3,020	1,553	2,132	2,075	2,014	2,139
6	1,190	1,939	2,070	8,442	7,547	4,452	3,095	1,555	2,302	1,180	1,934	2,195
7	2,240	1,588	2,151	7,888	7,418	4,594	2,302	1,734	1,929	2,196	2,024	2,170
8	2,351	1,688	2,121	8,936	7,053	4,787	2,757	1,817	1,291	2,016	2,035	1,683
9	2,391	1,875	1,873	9,097	6,753	4,326	2,901	1,667	2,074	1,979	1,938	2,276
10	2,526	1,275	1,663	9,202	6,450	5,120	2,687	1,697	1,804	1,922	1,127	2,137
11	1,977	1,992	2,490	9,675	6,025	4,996	2,501	888	2,060	2,017	2,063	2,667
12	3,266	2,006	2,638	9,678	5,178	5,048	2,533	1,871	2,201	1,984	2,077	2,867
13	2,830	1,836	2,813	9,643	5,875	4,837	2,426	1,724	1,874	1,008	2,179	2,957
14	3,662	1,829	2,855	8,943	5,307	4,593	1,518	1,694	2,019	2,290	2,138	2,904
15	3,606	1,935	3,258	9,390	5,480	4,806	2,347	1,699	1,303	1,938	2,248	4,276
16	3,843	2,002	3,404	9,307	5,339	3,970	2,231	1,710	2,273	1,922	2,220	4,708
17	3,780	1,495	3,286	8,811	4,901	4,354	1,858	1,720	2,209	1,896	1,384	4,408
18	3,545	2,124	3,855	8,685	4,699	4,086	1,830	682	1,969	2,095	2,172	4,681
19	2,343	1,869	4,037	8,642	3,975	3,934	1,813	1,630	1,712	1,983	2,363	4,551
20	2,106	1,827	4,376	7,932	4,385	3,975	1,769	1,518	1,812	1,359	2,143	4,376
21	2,697	1,818	5,189	8,995	4,335	3,763	948	1,684	1,947	2,101	2,210	4,069
22	2,855	1,850	5,589	8,868	4,361	4,096	1,295	1,715	960	1,994	2,339	3,871
23	2,780	1,927	5,983	9,080	4,409	3,803	1,129	1,684	2,030	2,010	2,068	4,063
24	2,769	1,886	5,629	9,599	4,435	4,574	1,170	1,567	1,989	1,886	1,397	3,859
25	2,822	2,417	6,481	9,514	4,028	4,368	1,061	1,146	1,883	1,897	2,576	4,237
26	2,715	2,267	6,680	9,654	3,090	4,355	1,088	1,822	1,763	1,892	2,416	4,098
27	2,143	1,921	7,590	7,899	4,000	4,117	1,044	1,839	1,752	1,261	2,677	3,897
28	2,738	2,198	7,791	9,478	3,854	3,905	635	1,848	1,778	2,026	2,196	4,074
29	2,402	.....	7,672	9,272	4,127	3,787	1,240	1,839	1,027	2,021	2,518	3,706
30	2,266	.....	7,661	9,272	3,926	2,931	1,252	1,887	1,921	1,887	2,378	4,096
31	1,274	.....	7,296	.....	4,321	.....	1,029	1,801	.....	1,881	.....	4,387
Mean	2,630	1,930	4,049	8,951	5,545	4,272	2,024	2,099	1,776	1,892	2,071	3,387
1902.												
1	3,922	2,755	4,414	6,520	3,738	1,753	2,057	4,078	2,540	2,353	2,441	2,785
2	3,977	1,504	6,017	6,341	3,371	2,717	2,045	4,008	2,628	1,980	2,529	2,576
3	4,030	2,929	8,110	6,080	3,490	2,700	2,148	3,440	2,224	2,098	2,896	2,561
4	3,489	2,227	8,399	6,039	2,540	2,551	1,434	3,983	2,162	2,001	2,770	2,503
5	2,747	2,214	8,920	5,704	3,408	1,717	1,867	3,965	2,138	1,264	2,199	2,511
6	3,656	2,231	9,403	4,700	3,224	1,765	1,799	3,870	1,927	3,498	2,593	2,419
7	3,754	2,312	8,995	5,527	3,223	2,356	2,406	3,676	1,141	2,197	2,574	1,867
8	3,529	2,212	9,051	5,429	3,244	1,710	2,759	3,509	2,403	2,146	2,643	2,723
9	3,776	1,517	8,800	5,314	3,264	2,853	2,931	3,533	1,955	2,180	2,383	2,089
10	3,875	2,590	9,374	5,454	3,126	2,087	3,067	3,297	1,874	2,188	2,834	1,977
11	3,838	2,479	9,349	5,569	2,135	2,443	3,344	3,790	1,809	2,181	2,679	1,816
12	2,965	2,429	9,081	5,468	3,213	2,600	3,268	3,643	1,863	1,398	2,263	1,871
13	3,645	2,656	9,407	4,700	2,963	2,516	2,580	3,589	1,805	2,196	2,424	1,786
14	3,172	2,726	9,237	5,535	2,551	2,270	3,265	3,463	1,213	2,223	2,594	1,251
15	3,023	2,527	9,233	5,409	2,455	1,631	3,311	3,266	2,073	2,133	2,476	1,967
16	2,605	1,979	8,422	5,349	2,567	2,750	3,127	3,276	1,951	2,292	1,946	1,338
17	3,090	2,599	9,330	5,444	2,650	2,780	2,960	3,640	1,921	2,041	2,830	1,795
18	3,045	2,513	9,492	5,240	1,657	2,630	2,770	3,169	1,355	2,748	2,612	1,817
19	2,172	2,655	9,033	5,173	2,799	2,606	2,648	3,074	1,847	1,420	1,932	2,114
20	3,192	2,411	8,802	4,496	2,514	2,533	1,979	3,097	1,709	2,671	2,626	2,061
21	2,986	2,363	8,699	5,454	2,506	2,315	2,695	2,926	1,146	2,353	2,743	1,920
22	3,259	2,030	7,923	4,501	1,662	1,737	2,672	2,825	2,213	2,217	2,292	2,786
23	3,120	1,457	8,217	4,480	2,654	2,641	3,210	2,597	1,841	2,286	2,858	3,356
24	3,092	2,387	8,391	4,318	2,705	2,301	3,041	1,999	1,887	2,331	2,917	2,789
25	3,156	2,417	8,074	4,165	2,075	2,102	3,527	2,977	1,603	2,337	2,597	1,477
26	2,509	2,010	8,936	3,792	3,441	2,209	3,538	2,678	1,545	1,729	1,941	2,848
27	3,499	2,650	7,902	3,474	2,805	2,146	2,974	2,509	1,621	2,432	2,612	2,040
28	2,989	2,822	7,667	4,232	2,785	2,001	3,802	2,370	1,296	2,401	2,887	2,375
29	3,041	.....	7,463	3,868	2,640	1,364	3,931	2,378	1,977	2,475	2,438	3,251
30	2,854	.....	6,516	3,881	2,389	2,123	3,843	2,327	1,785	2,312	2,631	3,091
31	2,854	.....	6,966	.....	2,663	.....	3,795	1,686	.....	2,435	.....	3,048
Mean	3,279	2,341	8,374	5,056	2,788	2,264	2,864	3,114	1,848	2,210	2,539	2,252

ONEIDA RIVER AT BREWERTON, ONONDAGA COUNTY, NEW YORK.

Oneida River is a stream 16 miles in length connecting Oneida Lake, of which it forms the outlet, with Seneca River at Three River Point, where the two unite to form the Oswego River. A record of the water level at the foot of the lake at Brewerton was kept in connection with the Topographical Surveys of the United States Deep Waterways from June 1st to September 9th, 1899. The record has been furnished by Albert J. Himes by whom it was established.

The gauge erected by the United States Deep Waterways at Brewerton was an 8-foot board divided to feet and tenths, attached horizontally to the downstream face of pier of foot bridge across the channel leading to Zett's Island at foot of lake. A lead weight and a wire running over a pulley, were used to take readings. Some uncertainty exists as to the accuracy of the latter portion of the record, owing to changing of the weight and wire. Gauge readings were taken twice each day by George H. Meeker. The channel where the gauge was placed is situated at the foot of the lake just above the highway bridge across Oneida River. Its water surface is subject to the same fluctuations of level as the lake surface, except during extreme low water, when, owing to its rapid fall, the elevation of the water in the channel is affected by surface slope. No current meter discharge measurements have been made at Brewerton.

At Caughdenoy, about three miles downstream from Brewerton, occurs a natural rift where a series of five eel-weirs have been constructed, consisting of W-shaped barriers across the stream, with openings in the form of lattice work through which the water passes; the crests of the eel-weirs being near the water surface. The combined fall produced by these weirs at Caughdenoy is four feet. A lock on the left-hand side affords means for navigation past the weirs. A water power privilege also exists in connection with the canal and lock at Caughdenoy where a fall of four feet has been obtained.

Daily Gauge Height of Oneida River at Brewerton, Onondaga Co., N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1						3.18	2.02	1.67	1.19			
2						3.10	2.00	1.75	1.16			
3						3.10	1.94	1.65	1.19			
4						3.10	1.94	1.66	1.13			
5						3.02½	1.95	1.64	1.10			
6						3.02	1.86	1.64	1.05			
7						2.95	1.88	1.62	1.02			
8						2.75	1.80	1.62	1.02			
9						2.82	1.79	1.62	.98			
10						2.78	1.79	1.70				
11						2.74	1.88	1.75				
12						2.70	1.85	1.67				
13						2.62	1.85	1.51				
14						2.60	1.78	1.51				
15						2.58	1.80	1.57				
16						2.60	1.78	1.48				
17						2.60	1.78	1.43				
18						2.50	1.68	1.42				
19						2.50	1.73	1.39				
20						2.44	1.79	1.40				
21						2.30	1.74½	1.42				
22						2.39	1.71	1.25				
23						2.35	1.76	1.27				
24						2.26	1.84	1.25				
25						2.26	1.93					
26						2.30	1.80	1.22				
27						2.28	1.79	1.30				
28						2.24	1.80	1.22				
29						2.13	1.76	1.23½				
30						2.08	1.65	1.21				
31							1.60	1.22				

ONEIDA RIVER AT OAK ORCHARD, ONONDAGA COUNTY, N. Y.

A gauging station was established at Oak Orchard August 31, 1902. The gauge readings are taken from the bulkhead of the lock above the State dam. Gauge readings are taken twice daily, at 7 a. m. and 6.30 p. m., by Arthur McArthur. Discharge measurements are made at Schroeppel's Bridge, 0.4 mile below the dam.

The location of the gauging station is shown on the Syracuse sheet of the United States Geological Survey. The station is nine miles below Oneida Lake and seven miles above the junction of Oneida and Oswego Rivers. The surface slope of the stream is very flat from Oak Orchard to the mouth at Three River Point, and the stream stage is probably affected by backwater from Seneca and Oswego Rivers at times. The gauge has been placed above the State dam to avoid this effect until its extent is more definitely determined. The drainage area above the gauging station is 1,313 square miles.

A current-meter discharge measurement by R. E. Horton, July 22, 1902, gave the following result: Gauge height, 2.75; discharge, 3,707 second-feet.

At Oak Orchard is a State dam and lock, the latter having a lift of 3.5 feet. On the left bank of the stream is an abandoned water power privilege. The dam is of timber with gravel backing, curved in plan. During extreme high water the dams at Oak Orchard and Chaughdenoy become entirely submerged. At such times backwater from the Phoenix dam on Oswego River extends to Oneida Lake, producing a smooth surface curve the entire length of Oneida River.

HIGH AND LOW WATER GAUGINGS OF OSWEGO RIVER AT FULTON, OSWEGO COUNTY, N. Y.

The following table shows a summary of measurements to determine the flow of Oswego River for water power purposes at the lower dam in Fulton. The measurements were made and the results furnished by O. C. Breed, C. E.

The water power at the dam is used jointly by five mills, each being entitled to the flow through an orifice of a certain area under the available head. In order to ascertain the amount of water used by each, the water is allowed to flow through openings formed in thin partitions in the sides of the bulkheads. The discharge through these openings was calculated by the formula for orifices, using a coefficient 0.62.

Observations of the head on the orifices were taken at thirty-minute intervals throughout twenty-four hours each day. A record was also kept of the elevation of water surface above the crest of the dam. The elevation of the masonry crest of the dam is 102.00. The dam is surmounted by flashboards having a top elevation 103.20. The water did not often flow over the flashboards. Such overflow, when it took place, has been calculated by means of the Francis formula, the length of the clear crest being 521 feet. The mean flow-rate for each one-half hour period has been obtained by summation of the discharge through the several orifices, and the flow over flashboards, if any. The mean daily flow in the table is the average of forty-eight such separate measurements.

Estimated Minimum Flow of Oswego River at Fulton, Oswego Co., N. Y., in 1900.

DATE.	MEAN DAILY FLOW.		Maximum daily flow second feet.	Minimum daily flow second feet.
	Second feet.	Second feet per square mile.		
1900.				
October 29	1,980	0.40	2,683	1,225
October 30	1,621	0.33	2,069	1,111
October 31	1,776	0.36	2,293	1,201
November 1	1,849	0.38	2,420	1,132
November 2	1,752	0.36	2,201	1,760
November 3	1,810	0.37	2,259	1,540
November 4 [a]	....	....	....	....
November 5	1,665	0.34	2,292	1,201
November 6	1,930	0.39	2,351	1,309
November 7	1,842	0.37	2,471	1,357
November 8	1,890	0.38	2,415	1,539
November 9	1,611	0.33	2,470	1,193
November 10	1,822	0.37	2,245	1,293

[a] Sunday.

When the water stood at an elevation exceeding 102.00, a small amount of leakage took place through joints and cracks in flashboards. This occurred but for a few hours each day. The exact amount of such leakage is indeterminate, but the average rate, when distributed through the entire day, is so small that no serious error is introduced in the table by neglecting it.

The drainage area above the dam is 4,916 square miles, and the table shows a minimum run-off of one-third second foot per square mile in 1900. The measurements given above were checked by rod floats through a 600-foot section of the river channel with rock bottom.

During the high water season of March, 1902, the following data of maximum discharge was obtained at the lower dam in Fulton. The dam has a horizontal crest of 521 feet in length. The discharge has been calculated by the weir formula, using suitable coefficients obtained in the Cornell experiments for a similar form of cross-section.

High Water Discharge of Oswego River at Lower Dam, Fulton, Oswego Co., N. Y., in 1902.

DATE.	Time.	Discharge second-feet.	Second-feet per square mile.
1902.			
March 2	9 A. M.	*a*10,200	2.07
March 2	5 P. M.	13,700	3.15
March 3	7 A. M.	19,200	3.90
March 3	P. M.	19,700	4.00
March 9	9 A. M.	18,000	3.66
March 10	10 A. M.	18,700	3.80
March 13	12 M.	21,400	4.35
March 16	10 A. M.	20,215	4.11
March 17	8 A. M.	21,100	4.29
March 23	10 A. M.	19,400	3.94
March 30	9 A. M.	15,500	3.15

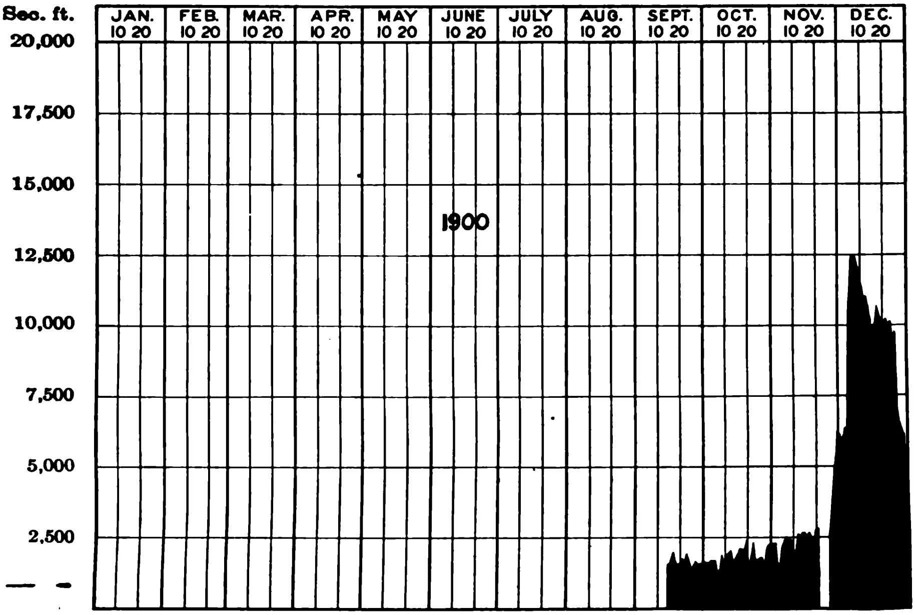
(*a*) Ice went off from pond above dam.

OSWEGO RIVER ABOVE MINETTO, OSWEGO COUNTY, N. Y.

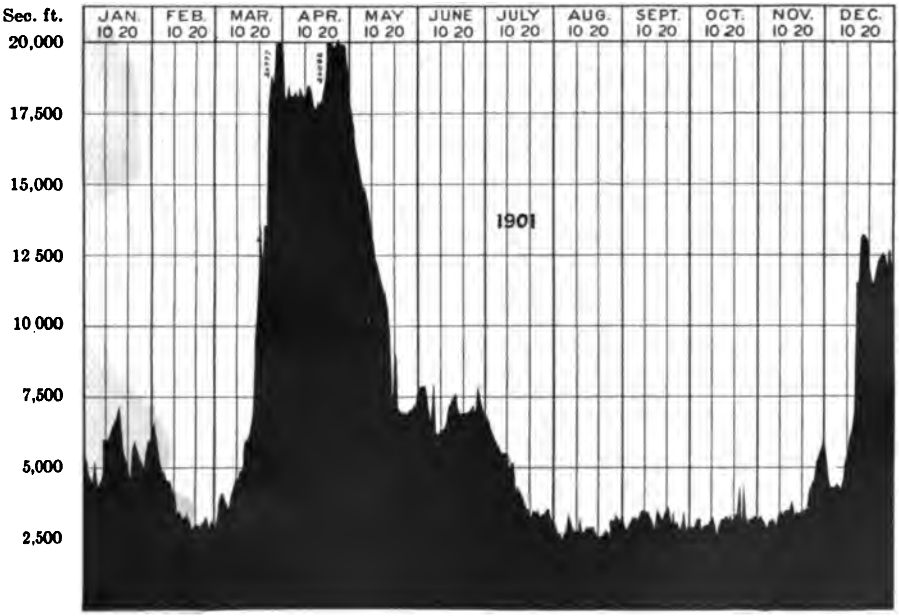
Oswego River is formed by the junction of Oneida and Seneca Rivers at Three River Point. It has extensive natural storage in Oneida Lake, which covers an area of 80 square miles, and in the "finger lakes" of Central New York which it drains. Certain of the tributary lakes serve as reservoirs for the water supply of the middle division of Erie Canal and a portion of their outflow is diverted for this purpose.

Mean Daily Flow in Second-feet of Oswego River, at Minetto, Oswego County, N. Y.

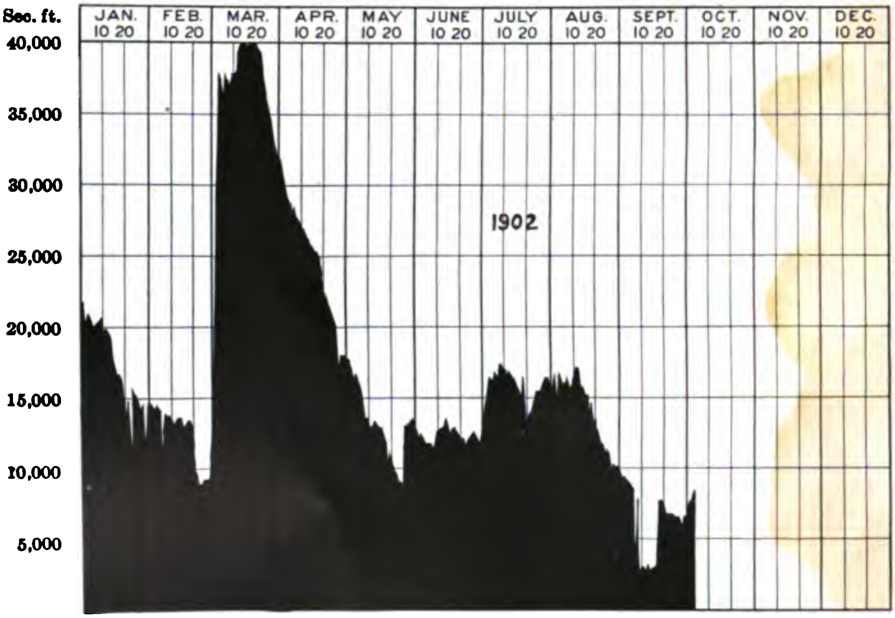
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,620	2,280	6,080
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,620	2,280	5,819
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,620	1,552	6,448
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,704	1,552	6,448
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,704	2,184	10,644
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,704	2,424	12,477
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,280	2,520	12,477
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,348	2,472	12,477
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,914	2,376	12,150
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,704	2,280	11,714
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,872	1,746	11,496
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,998	2,688	11,060
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,040	2,576	11,060
14	.....	.....	.....	.....	.....	.....	.....	.....	1,586	1,662	2,632	10,748
15	.....	.....	.....	.....	.....	.....	.....	.....	1,586	1,746	2,632	9,917
16	.....	.....	.....	.....	.....	.....	.....	.....	1,745	1,914	2,576	9,917
17	.....	.....	.....	.....	.....	.....	.....	.....	1,998	2,136	2,632	10,020
18	.....	.....	.....	.....	.....	.....	.....	.....	1,620	2,040	2,472	10,748
19	.....	.....	.....	.....	.....	.....	.....	.....	1,518	2,040	2,424	10,332
20	.....	.....	.....	.....	.....	.....	.....	.....	1,662	2,472	2,968	10,228
21	.....	.....	.....	.....	.....	.....	.....	.....	1,746	1,280	2,968	10,124
22	.....	.....	.....	.....	.....	.....	.....	.....	1,704	1,830	.....	10,228
23	.....	.....	.....	.....	.....	.....	.....	.....	1,956	2,328	.....	10,020
24	.....	.....	.....	.....	.....	.....	.....	.....	1,662	1,704	.....	10,124
25	.....	.....	.....	.....	.....	.....	.....	.....	1,314	1,704	.....	9,608
26	.....	.....	.....	.....	.....	.....	.....	.....	1,518	1,746	2,688	9,814
27	.....	.....	.....	.....	.....	.....	.....	.....	1,620	1,746	3,656	7,198
28	.....	.....	.....	.....	.....	.....	.....	.....	1,586	1,320	4,586	6,632
29	.....	.....	.....	.....	.....	.....	.....	.....	1,586	2,136	5,297	6,356
30	.....	.....	.....	.....	.....	.....	.....	.....	1,552	2,232	6,264	6,172
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,376	.....	4,898
Mean	.....	.....	.....	.....	.....	.....	.....	.....	1,644	1,823	2,797	9,465



Discharge of Oswego River above Minetto, Oswego County, N. Y., 1900.



Discharge of Oswego River above Minetto, Oswego County, N. Y., 1901.



Discharge of Oswego River above Minetto, Oswego County, N. Y., 1902.

Mean Daily Flow in Second-feet of Oswego River at Minetto, Oswego Co., N. Y.—(Concluded)

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1..........	5,297	6,540	2,856	18,190	17,475	7,792	6,724	2,856	2,744	2,968	3,080	4,508
2..........	4,820	5,906	3,336	18,080	16,990	7,792	6,540	2,688	2,744	2,856	3,272	4,359
3..........	4,586	5,210	3,862	18,550	16,174	7,792	6,264	2,688	2,856	2,912	3,024	4,288
4..........	4,430	4,976	4,075	18,190	15,832	7,297	6,080	2,472	3,024	3,144	2,968	4,288
5..........	5,132	4,820	3,862	18,190	15,377	6,816	5,906	2,632	3,144	3,144	2,856	4,359
6..........	4,217	4,742	3,656	18,300	14,925	6,540	5,732	2,744	3,144	2,744	3,024	4,288
7..........	4,359	4,508	3,592	18,080	14,812	7,891	5,645	3,272	3,080	2,856	3,080	4,217
8..........	4,508	4,508	4,004	18,425	14,360	6,080	5,471	2,912	3,208	2,912	3,024	4,586
9..........	5,906	4,075	4,288	18,190	13,912	6,080	5,471	2,744	3,400	2,912	2,968	5,210
10..........	5,384	2,472	4,508	18,080	13,464	6,264	5,471	2,688	3,336	3,024	3,272	5,297
11..........	5,993	3,336	4,508	18,550	12,804	6,264	4,976	2,688	3,272	3,208	3,400	5,645
12..........	6,172	3,464	4,820	18,550	12,368	6,356	5,054	3,080	3,336	2,912	3,336	6,264
13..........	6,448	3,336	4,898	18,300	12,041	6,632	5,054	2,688	3,080	2,576	3,464	6,908
14..........	6,540	3,080	5,819	17,830	11,714	7,099	4,146	2,688	3,024	2,968	3,464	11,496
15..........	6,724	3,208	5,993	17,715	11,387	7,297	4,217	2,856	2,632	3,144	3,400	11,387
16..........	7,099	3,208	6,172	17,830	11,169	7,396	4,075	2,800	3,400	3,144	3,791	13,022
17..........	5,993	3,080	6,540	17,955	10,540	7,594	3,933	2,800	3,272	3,208	3,272	13,240
18..........	5,471	2,912	6,816	18,080	9,608	7,000	3,656	2,800	3,080	3,144	3,336	13,131
19..........	5,297	2,800	9,505	18,675	7,297	6,816	3,528	2,688	3,272	3,272	3,272	13,022
20..........	5,054	2,800	10,748	19,355	9,196	6,816	3,400	2,520	3,336	2,912	3,336	12,150
21..........	4,508	2,912	13,688	20,066	8,790	6,816	3,144	2,520	3,528	3,272	3,464	11,496
22..........	5,645	2,856	12,368	20,066	7,099	6,816	3,400	2,520	2,968	3,272	3,464	11,605
23..........	5,906	2,968	13,688	19,829	6,908	6,816	3,336	2,688	3,336	4,288	3,592	11,823
24..........	5,645	3,080	13,688	19,948	6,908	7,000	3,400	2,744	2,968	2,912	4,146	12,259
25..........	5,297	3,208	17,955	20,066	6,816	7,099	3,208	2,632	3,080	4,288	4,359	12,368
26..........	5,132	2,800	19,118	19,829	6,816	6,816	3,272	3,144	2,744	3,208	4,508	12,586
27..........	4,820	3,144	18,800	19,829	7,000	7,891	3,272	3,024	2,968	3,024	5,132	12,477
28..........	5,558	2,744	20,540	19,829	7,000	13576	3,400	3,272	3,464	3,080	5,297	11,932
29..........	5,819	.....	20,777	19,000	7,198	7,198	3,400	3,144	2,632	3,080	5,645	12,695
30..........	5,906	.....	20,303	18,080	7,198	6,816	3,144	3,024	2,856	3,208	5,819	11,823
31..........	6,080	.....	19,711	......	6,816	.....	2,968	3,208	.....	3,080	.....	11,169
Mean......	5,475	3,667	9,499	18,721	10,967	7,215	4,428	2,813	3,097	3,118	3,668	9,158
1902.												
1..........	10,956	7,396	8,690	15,718	8,890	6,080	7,396	8,390	4,742	3,656	5,601	5,514
2..........	10,124	7,297	14,699	15,151	8,790	6,172	7,891	7,297	4,742	3,933	5,732	5,297
3..........	10,644	7,198	19,237	14,812	8,690	6,080	8,290	8,290	4,586	4,004	5,732	5,210
4..........	10,332	7,396	19,000	14,586	8,190	5,993	8,290	8,190	4,586	4,288	5,732	5,210
5..........	10,020	7,297	18,900	14,473	8,390	5,993	8,590	8,090	4,430	4,004	5,732	3,614
6..........	10,020	7,099	19,237	14,024	8,090	5,993	8,290	8,090	4,288	4,146	5,601	5,054
7..........	10,124	5,210	19,000	14,248	7,792	5,906	8,790	8,290	1,416	4,146	5,732	4,586
8..........	10,228	7,000	18,550	13,912	7,396	5,732	8,790	7,891	4,004	4,288	5,906	4,820
9..........	10,332	6,908	19,000	13,800	6,908	6,264	8,690	7,990	1,348	4,288	4,508	4,898
10..........	10,020	6,908	19,000	13,576	6,908	6,356	8,690	8,290	1,620	4,288	5,861	4,976
11..........	9,711	6,632	19,355	13,464	6,448	6,448	8,590	8,690	1,586	4,288	5,906	5,132
12..........	9,917	6,816	19,829	13,240	6,724	6,540	8,490	8,590	1,518	4,004	5,732	5,210
13..........	9,814	6,908	21,518	13,131	6,632	6,816	8,490	7,990	1,620	4,146	5,732	5,210
14..........	9,711	6,724	21,518	12,913	6,540	6,540	8,290	7,990	1,484	4,288	5,558	5,384
15..........	8,990	6,540	21,400	12,804	6,356	6,264	8,090	7,693	1,552	4,288	5,471	5,384
16..........	8,790	6,540	19,948	12,695	6,172	6,448	7,792	7,693	1,552	4,586	4,898	5,558
17..........	8,390	6,724	20,066	12,695	5,906	6,540	7,693	7,198	1,620	4,742	5,732	5,645
18..........	8,390	6,724	20,540	12,477	5,132	6,356	8,290	7,396	3,862	4,742	5,906	5,558
19..........	8,190	6,540	20,185	12,041	5,558	6,264	6,816	6,632	3,933	4,430	6,034	5,558
20..........	7,495	5,054	20,303	10,852	5,132	6,080	7,297	6,540	3,862	4,586	6,080	5,384
21..........	6,816	4,820	19,829	11,278	4,898	6,172	7,099	6,264	3,400	4,288	6,080	4,976
22..........	7,396	4,430	19,711	11,060	4,820	5,906	7,099	5,993	3,464	4,664	6,218	4,898
23..........	5,819	4,430	19,000	10,748	4,586	6,080	7,495	5,906	3,464	5,210	5,993	5,384
24..........	7,891	4,508	18,425	10,436	4,586	6,172	7,891	5,645	3,464	5,384	6,264	5,471
25..........	7,693	4,586	17,955	10,228	4,359	6,264	7,792	5,645	3,336	5,558	6,264	5,384
26..........	7,594	4,586	17,600	10,020	6,632	6,356	8,090	5,558	3,336	5,558	6,264	5,210
27..........	7,297	4,898	17,230	8,690	6,540	6,172	8,190	4,976	3,336	5,558	6,172	5,210
28..........	7,099	7,495	16,516	9,093	6,632	5,993	8,290	5,210	2,968	5,558	6,034	4,586
29..........	7,297	.....	16,060	9,093	6,724	6,080	8,290	5,054	3,272	5,732	5,819	4,586
30..........	5,906	.....	16,402	9,093	6,816	6,448	8,090	5,054	3,336	5,732	5,645	4,820
31..........	7,396	.....	16,060	......	6,356	.....	7,891	4,430	.....	5,732	.....	4,898
Mean........	8,722	6,238	18,540	12,345	6,567	6,216	8,056	6,998	3,057	4,648	5,797	5,116

Mean Monthly Run-off of Oswego River Above Minetto, Oswego County, N. Y.
[Drainage area, 4,990 square miles.]

MONTH.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
1900.			
January	....	....	....
February	....	....	....
March	....	....	....
April	....	....	....
May	....	....	....
June	....	....	....
July	....	....	....
August	....	....	....
September	1,644	.32	36
October	1,823	.36	.41
November	2,797	.56	.62
December	9,465	1.89	2.18
1901.			
January	5,475	1.09	1.26
February	3,667	.73	.76
March	9,499	1.90	2.19
April	18,721	3.74	4.17
May	10,967	2.19	2.52
June	7,215	1.44	1.61
July	4,428	.88	1.01
August	2,813	.56	.64
September	3,097	.62	.69
October	3,118	.62	.84
November	3,668	.73	.81
December	9,158	1.83	2.11
1902.			
January	8,722	1.64	1.89
February	6,238	1.25	1.31
March	18,540	3.71	4.28
April	12,345	2.47	2.76
May	6,567	1.31	1.51
June	6,216	1.24	1.38
July	8,056	1.61	1.86
August	6,998	1.40	1.61
September	3,057	.61	.08
October	4,648	.94	1.08
November	5,797	1.16	1.29
December	5,116	1.02	1.18

Estimated Pondage Areas in Oswego River Drainage Basin. (a)

STREAM BASIN.	Drainage area, square miles.	Area of water surface, square miles.	Flats and marsh, square miles.	Total pondage area, square miles.	Percentage of entire drainage area.
Seneca	3,433	215	89	304	....
Oneida	1,402	90	129	218	....
Oswego	167	4	3	8	....
Total	5,002	309	221	530	10.6

Oswego River has been canalized by the construction of dams affording slack-water navigation on a part of the stream. Surplus water at the State dam supplies power to the numerous

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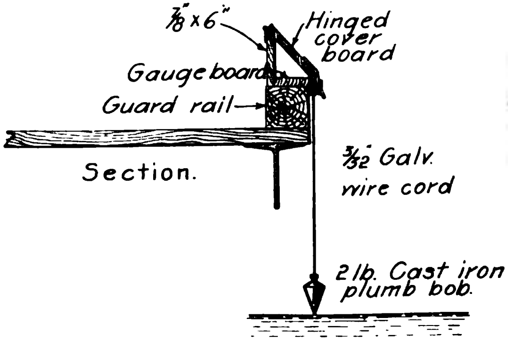
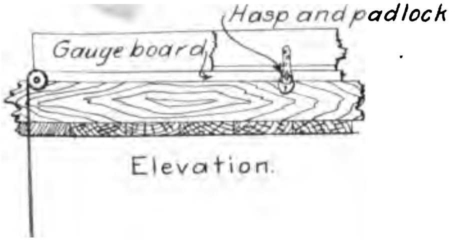
(a) Based upon table at p. 794, Report U. S. Board of Engineers on Deep Waterways. 1900.



Section.



Elevation.

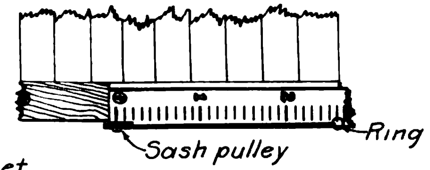
PLAN OF WEIGHT GAUGE

Scale

Elev water surface when Gauge reads zero   feet

Elev. Pulley axis   feet.

Length of line, 0 on ring to point of bob   feet.



Plan.

mills situated along the adjacent banks. Lateral canals and locks carry boats around the dams and connect with back-water from the next succeeding dam in each instance.

In establishing a gauging station it was impossible to measure the entire stream in a single channel, for the reason that in order to avoid slackwater from dams, it was necessary to select a site where the river is paralleled by the canal. A cable station was established September 14, 1900, three miles above Minetto and six-tenths mile below the State dam at Battle Island. The cable has a clear span of 376 feet between supports on the banks.

The stream channel underneath has a smooth sandstone bed. The gauge board was placed on the left bank about one-eighth of a mile downstream from the dam. A weight is used, being suspended from a frame-work projecting over the water, beyond the low water margin. The position of the weight when the gauge reads zero has been determined with reference to an arbitrarily fixed bench mark, and the gauge readings are reduced to equivalent elevations of water surface referred to this bench mark. Morning and evening readings are taken, usually 12 hours apart, by H. L. Woodcock, and the average of the two readings is given in the tables.

The current meter measurements given below do not include diversion through Oswego Canal.

A rating curve for the cross-section at the cable station has been plotted from the above discharge measurements and those previously made, and the daily discharge and run-off calculated as given in the accompanying tables. No allowance for water diverted to Oswego Canal has been made; it is the intention, however, to make a series of measurements of the flow in this canal.

March 13, at 5 p. m., the stream reached an elevation of water surface of 94.45, corresponding to a discharge of about 22,500 second-feet, or 4.5 second-feet per square mile. The ice flowed out of the level in which the cable is situated March 7th.

Current Meter Discharge Measurements of Oswego River at Cable Station, 1900–1901.

DATE.	Elevation of water surface, feet.	Discharge, second-feet.	Hydrographer.
September 15, 1900	83.57	1,677	R. E. Horton.
August 27, 1901	84.97	2,938	E. C. Murphy.
August 27, 1901	85.07	3,203	E. C. Murphy.
August 28, 1901	85.09	3,169	E. C. Murphy.
August 28, 1901	85.09	3,066	E. C. Murphy.
August 7, 1901	85.12	3,277	E. C. Murphy.
August 7, 1901	85.14	3,224	E. C. Murphy.
July 12, 1901	86.24	5,264	E. C. Murphy.
May 23, 1901	88.35	6,982	R. E. Horton.
April 13, 1901	92.77	18,452	R. E. Horton.

Current-meter Discharge Measurements of Oswego River at Cable Station, 1902.

DATE.	Elevation of water surface, feet.	Discharge, second-feet.	Hydrographer.
1902.			
August 19	87.34	6,562	E. C. Murphy.
August 19	87.44	6,999	E. C. Murphy.
July 21	87.87	8,445	R. E. Horton.
July 9	88.37	8,585	E. C. Murphy.
July 9	88.41	9,019	E. C. Murphy.
July 8	88.42	8,634	E. C. Murphy.
July 8	88.44	8,601	E. C. Murphy.
April 1	91.52	15,653	E. C. Murphy.
March 31	91.77	15,982	E. C. Murphy.

On April 13, 1901, the depth of water flowing over the Battle Island dam, one-eighth mile above the gauge, was observed for comparison with the current meter measurement. The calculated discharge over the dam was 17,520 second-feet, not including leakage. The lowest water on the stream usually occurs Sundays, due to the stopping of waterwheels and the consequent filling of mill ponds at Fulton, four miles upstream.

In this connection, reference may be made to the gauging record which was maintained by the United States Board of Engineers on Deep Waterways on Oswego River at the Oswego Falls dam, from November, 1898, to May, 1899, inclusive. Description of this station may be found in Water Supply Paper of United States Geological Survey No. 36, page 188. The drainage areas tributary to Oswego River at the different gauging stations are as follows:

Cable Station on Oswego River, eight miles from Lake Ontario, Oswego County, N. Y.

N. Y. State High Dam on Oswego River, three miles from Lake Ontario, Oswego County, N. Y.

Drainage Areas of Oswego River.

LOCATION.	Drainage area, square miles.
Mouth	5,002
High dam	5,000
Cable station	4,990
Fulton	4,916

OSWEGO RIVER AT HIGH DAM, OSWEGO COUNTY, N. Y.

This is a State dam on Oswego River, three miles from Lake Ontario, having its crest 32 feet higher than mean lake level, and affording an effective head of about 13 feet. The record kept by the *Oswego Waterworks Company has been furnished by Thos. H. Bennett, Superintendent. The distance down to the water surface in the pond above the dam is measured from the top of a bulkhead, having a known elevation with reference to the crest of the dam. Gauge readings were taken daily, with the exception of Sundays and holidays.

Owing to the use of the stream for navigation purposes, an effort is made to keep the water up to a certain level at all times. The dam is of masonry, with a crest 365.5 feet long. Flashboards are maintained on the dam during the greater part of the year. When flashboards are on, the flow over the dam has been computed by means of the Francis formula. In estimating the flow when flashboards are removed, a discharge curve has been prepared using coefficients in the weir formula derived from Cornell Experiment No. 3[a], and taking into consideration the irregularities in the profile of the crest. Since the record was started, the water has not been down low enough to afford an opportunity for making a new profile of the dam. One which was made in 1896 has been used in the calculations.

No opportunity has been offered for directly measuring the leakage of the dam. Owing to the leakage and possible settlement of the dam since the profile used was obtained, the records as calculated probably gives too small results for low water, and may be revised upon the acquisition of new data. A headrace at the left-hand end of the dam diverts water to supply an electric light plant and waterworks pumping station. Eight water wheels are in use. A regular record of the run of the water wheels has not been kept and the diversion for this purpose has been estimated from current meter measurements made in the headrace.

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[a] See Transactions, Am. Soc. C. E., Vol. XLIV, p. 274.

* Now owned by the city.

Measured Flow in Headrace at High Dam.

DATE.	Working head on wheels, feet.	Measured discharge (second-feet).
June 12, 1900	13	323
September 15, 1900	14	352
July 21, 1902	13	[b] 650

[b] All water wheels running.

Three pairs of wheels, which were running when the first two above measurements were made, are run 24 hours per day. Taking the average of the above measurements and allowing 105 second-feet for the additional pair of wheels, the diversion for water power under average conditions has been taken at 450 second-feet, as a round figure. The flow over the auxiliary spillway at the end of the headrace has been calculated by the weir formula, using coefficients derived by Bazin for a dam having a similar cross section. Some uncertainty attaches to the record at High Dam during the spring months, owing to the carrying away of the flashboards by high water at dates not definitely ascertained. In the accompanying tables of monthly and daily mean flow no allowance has been made for diversion to the Oswego Canal.[a]

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[a] Tables of daily gauge heights, etc., at this station are given in Water Supply Paper of U. S. Geol. Survey, No. 36, p. 189.

Mean Daily Flow in Second-feet of Oswego River at "High Dam" Two Miles Above Oswego, N. Y.

[Drainage area, 5,000 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1897.												
1	.....	.....	.....	12,150	.	4,500	1,470	*3,300	1,760	1,200	1,020	3,000
2	.....	.....	.....	11,550	*7,750	4,620	2,650	3,300	.....	1,150	1,260	3,000
3	.....	.....	.....	10,950	7,550	4,620	2,480	.....	1,700	*..	1,430	3,220
4	.....	.....	.....	*.....	7,250	4,620	*.....	3,300	1,670	850	1,430	2,950
5	.....	.....	.....	10,950	7,220	..	2,480	3,050	*.....	1,050	1,320	*3,850
6	.....	.....	.....	10,950	6,900	*4,520	2,400	..	1,550	1,100	1,430	.....
7	.....	.....	.....	10,950	6,800	4,520	2,150	2,870	1,760	1,100	*.....	3,620
8	.....	.....	.....	10,750	.....	4,400	1,750	*	1,6[illegible]0	970	1,370	3,620
9	.....	.....	.....	11,650	*6,600	4,400	1,820	2,150	1,840	920	1,430	4,400
10	.....	.....	.....	.....	6,400	4,400	1,750	2,330	1,670	*..	1,570	4,550
11	.....	.....	.....	*11,550	6,400	4,400	*..	2,3[illegible]0	720	1,050	1,430	4,800
12	.....	.....	.....	11,550	..	.	2,300	2,500	*.....	1,050	1,480	*..
13	.....	.....	.....	11,550	6,275	*4,400	1,670	2,330	1,100	960	1,320	4,650
14	.....	.....	.....	10,950	6,150	4,170	1,480	2,450	1,270	1,220	*1,320	4,550
15	.....	.....	.....	10,950	...	4,170	1,670	*	1,150	1,100	...	5,500
16	.....	.....	.....	10,750	*6,275	4,150	1,830	2,150	1,200	1,150	1,680	5,400
17	.....	.....	.....	.....	6,275	3,900	1,830	2,500	1,020	*..	1,750	5,500
18	.....	.....	.....	*10,200	6,275	3,770	*	2,500	970	750	1,850	5,500
19	.....	.....	.....	9,800	5,900	..	1,980	2,330	*..	1,100	2,020	*.....
20	.....	.....	.....	9,550	5,050	*3,610	1,960	2,330	850	1,800	2,020	5,500
21	.....	.....	.....	9,350	5,650	3,070	1,980	2,250	880	.....	*.....	5,100
22	.....	.....	.....	9,250	.....	3,070	1,830	*	920	1,220	2,120	4,780
23	.....	.....	.....	9,100	*5,520	2,870	1,900	2,000	920	1,220	1,850	4,780
24	.....	.....	.....	8,900	5,250	2,870	1,670	1,900	920	*.....	2,120	3,680
25	.....	.....	.....	*8,100	5,520	2,670	*.....	1,900	1,100	1,150	2,120	3,200
26	.....	.....	.....	8,100	5,250	.....	2,480	1,850	*.....	1,100	2,120	*.....
27	.....	.....	.....	8,100	5,150	*2,870	2,660	1,850	1,020	1,050	2,870	3,850
28	.....	.....	.....	8,100	5,150	2,550	2,660	1,850	1,350	1,100	*..	3,420
29	.....	.....	.....	8,06	.....	2,970	3,500	*.....	970	1,020	3,650	2,900
30	.....	.....	.....	7,500	*5,500	2,720	3,170	1,760	1,050	1,020	3,650	3,620
31	.....	.....	.....	.....	5,500	.....	3,240	2,160	.....	*.....	.....	3,480
Mean.	.....	.....	.....	10,048	6,166	3,801	2,174	2,370	1,244	1,076	1,821	4,168
1898.												
1	2,600	5,520	10,350	9,400	*.....	6,430	2,780	780	1,480	.....	3,250	3,900
2	*..	5,520	10,200	9,250	8,250	.....	2,780	780	1,480	*1,470	3,250	3,900
3	3,000	5,520	9,900	*...	8,080	6,540	*.....	780	1,400	.....	3,250	.....
4	2,600	5,000	9,600	8,750	8,850	5,630	.....	1,200	*950	1,470	3,250	*4,700
5	3,320	5,000	9,250	8,620	8,900	*5,630	.....	950	1,330	1,400	.....	3,900
6	2,900	*.....	*.....	8,300	8,960	5,630	.....	850	1,260	.....	*3,050	3,450
7	3,430	5,520	8,820	8,080	9,120	5,630	1,480	*850	1,260	1,330	3,220	3,900
8	3,220	5,000	8,960	7,800	*..	4,880	.....	1,070	1,770	.....	3,050	3,350
9	*...	5,100	8,960	7,500	9,120	4,880	.....	850	1,700	*1,400	3,250	3,150
10	2,820	5,100	8,960	*.....	8,960	4,650	*1,200	850	1,770	1,260	4,800	.....
11	2,820	5,1[illegible]0	9,100	7,370	8,670	4,650	1,200	7[illegible]0	*1,480	1,200	4,9[illegible]0	*3,260
12	3,220	6,550	9,400	6,950	.....	*4,650	1,3[illegible]0	680	1,630	1,200	.....	3,260
13	4,770	*.....	*.....	6,650	8,370	4,400	1,950	630	1,770	860	*5,800	2,300
14	5,100	5,400	10,200	6,650	8,370	4,170	1,950	*900	1,480	.....	5,800	2,100
15	5,500	5,100	10,350	6,420	*8,280	4,100	.....	680	1,330	.....	5,530	2,470
16	*..	4,600	10,350	6,420	.....	.....	..	850	1,330	*1,770	5,300	2,650
17	6,280	6,750	10,550	*.....	.....	3,770	*.....	850	1,700	1,630	5,200	.....
18	5,400	7,080	10,350	6,080	7,370	3,770	.....	850	*1,200	1,770	5,050	*2,850
19	5,400	7,080	10,350	5,900	7,370	*3,500	.....	850	1,200	1,770	.....	2,650
20	5,400	*.....	*.....	6,700	.....	3,500	.....	850	1,200	1,950	*5,050	2,850
21	6,150	7,350	10,350	6,000	.....	3,500	.....	*760	1,200	1,950	5,050	3,900
22	6,400	7,350	10,550	5,900	*.....	3,300	.....	900	1,200	.....	5,300	4,580
23	*.....	7,750	10,550	5,900	6,850	3,300	.....	850	1,200	*2,460	4,900	5,650
24	7,880	8,150	10,350	*..	.....	3,170	*.....	760	1,330	2,850	4,770	.....
25	7,880	8,150	10,350	8,080	.....	.....	.....	830	*1,400	2,850	4,770	*5,800
26	5,950	8,150	10,200	8,500	6,670	*.....	.....	1,480	930	2,920	.....	5,800
27	7,600	*.....	*.....	8,960	.....	.....	.....	1,320	1,330	3,050	*4,580	5,650
28	6,550	7,680	9,880	9,100	.....	2,970	.....	*1,320	1,200	3,300	4,580	4,770
29	6,550	.....	9,880	8,900	*.....	2,850	.....	1,320	1,330	3,250	4,350	5,300
30	*.....	.....	9,750	8,850	.....	2,780	.....	1,130	1,400	*..	4,350	5,300
31	4,550	.....	9,750	.....	6,550	.....	*.....	1,180	.....	3,250	...	.....
Mean.	4,896	6,238	9,898	7,578	8,161	4,331	1,834	925	1,877	2,018	4,452	3,899

* Sundays.

Mean Daily Flow in Second-feet of Oswego River at "High Dam," Two Miles Above Oswego, N. Y. — (Continued).

DAY.	Jan.	Feb	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1	*4,450	2,750	3,670	6,300	9,600	5,370	......	580	670	*540	1,100	650
2	4,020	2,570	3,900	*......	9,600	5,370	*1,000	650	......	650	1,100	......
3	4,450	2,750	4,120	6,550	9,600	......	......	650	*450	650	1,350	*980
4	5,170	......	4,120	6,550	......	*4,400	1,000	650	580	580	......	980
5	......	*2,370	*5,050	6,550	8,650	4,400	1,000	......	510	580	*1,450	780
6	5,580	2,370	850	6,550	......	3,950	780	*650	510	580	1,500	980
7	4,700	2,300	5,300	6,300	*6,950	1,230	650	650	650	......	1,350	980
8	*4,100	1,070	4,800	......	8,080	1,000	......	515	540	*......	980	980
9	3,250	530	4,580	*8,530	7,520	780	*1,000	650	......	540	1,350	......
10	3,050	630	4,580	8,250	6,960	......	900	580	*2,670	540	980	1,360
11	3,250	......		8,530	6,960	*900	1,000	650	510	540	......	1,100
12	3,250	*630	*5,050	8,800	......	900	780	......	450	540	*1,350	1,980
13	3,900	1,640	5,050	8,800	......	720	780	*580	520	480	940	1,100
14	......	1,950	4,800	8,550	*6,150	1,800	650	540	650	510	1,100	1,500
15	*5,530	2,370	4,900	......	6,150	1,800	......	580	480	*......	940	1,500
16	5,650	2,660	5,050	*8,530	6,420	1,800	*900	650	450	510	980	......
17	5,650	2,470	4,900	8,530	6,420	......	720	650	*......	480	980	*2,500
18	5,280		......	8,530	6,420	*1,800	650	450	......	580	......	2,500
19	5,170	*2,470	*4,580	8,250	6,150	1,650	650	......	480	460	*1,100	2,700
20	5,280	2,750	4,580	8,590	......	1,650	650	*450	540	540	980	2,500
21	......	2,850	4,700	7,670	*6,150	1,500	580	540	450	......	1,100	2,700
22	*4,780	3,260	......	......	6,150	1,500	......	650	480	*650	980	2,500
23	4,780	3,260	5,050	*7,550	6,150	1,230	*650	580	......	650	980	......
24	4,580	3,260	4,900	7,200	6,150	......	650	510	*450	650	......	*2,500
25	5,050	......	......	6,820	5,630	*1,500	580	580	540	580	......	2,500
26	5,180	*3,910	*5,650	6,820	5,400	1,800	......	580	540	510	*......	1,500
27	2,300	3,800	5,650	6,680	......	1,500	650	*540	540	650	980	1,500
28	3,050	3,800	5,550	6,820	*5,400	......	580	540	540	......	980	1,120
29	*2,300	......	6,550	......	5,400	780	......	980	540	*900	980	780
30	2,650	......	6,830	*9,900	5,400	720	*580	800	......	650	780	1,820
31	2,650	......	6,830	....	5,400	......	580	650	......	650	......	*....
Mean	4,252	2,475	4,874	7,694	6,754	2,002	748	612	615	585	1,095	1,612
1900.												
1	1,820	2,480	4,140	*11,600	11,480	4,880	*2,000	650	......	720	1,220	......
2	1,360	2,880	1,970	12,250	11,150	4,880	1,840	720	*650	780	1,220	*9,580
3	1,360	......	3,930	12,250	10,530	*4,650	1,060	980	650	780	980	8,960
4	1,820	*4,600	*3,930	12,250	9,900	4,180	1,420	......	650	780	*......	10,760
5	1,500	3,700	4,600	12,600	9,600	3,980	2,150	*780	650	780	1,220	10,760
6	......	3,250	4,600	12,600	*8,980	3,980	3,500	650	720	......	1,220	11,120
7	*1,820	3,700	4,800	......	8,980	3,980	......	650	720	*900	1,220	11,460
8	1,820	5,050	4,600	*17,550	9,900	4,180	*650	720	......	900	1,500	11,460
9	2,150	5,300	4,600	16,800	8,980	3,500	580	650	*720	900	1,220	*10,500
10	1,820	......	......	16,450	8,670	*3,300	460	650	650	900	1,650	10,760
11	1,820	*5,550	*4,140	16,040	8,670	3,300	580	650	650	900	*......	9,880
12	......	7,960	4,350	16,040	8,080	3,080	550	*650	580	980	1,500	9,880
13	......	6,320	4,140	16,040	*......	3,080	510	650	580	......	......	9,280
14	*1,970	7,130	4,350	......	8,080	3,080	......	......	680	*720	1,500	8,060
15	1,970	6,320	4,350	*15,330	7,800	2,880	*780	980	......	720	1,500	......
16	1,650	6,850	4,140	14,940	7,250	......	720	580	*650	780	1,500	*7,840
17	......	6,050	......	14,940	7,250	*3,500	780	650	580	780	......	6,760
18	2,720	*6,050	*3,930	14,600	6,950	2,880	780	......	580	980	*1,500	8,120
19	3,250	......	4,140	14,250	......	2,700	780	*650	580	......	1,500	7,840
20	......	5,050	4,140	14,600	*6,420	2,700	780	720	780	780	1,650	7,840
21	*6,320	5,050	4,600	......	6,420	2,500	......	650	780	*780	1,820	7,840
22	6,600	5,350	5,300	*14,250	5,900	2,320	*780	650	......	780	1,650	......
23	6,320	4,600	5,550	13,850	6,420	......	720	580	*780	980	1,650	*8,680
24	5,800	......	6,600	13,850	5,900	*2,320	720	580	550	900	......	8,120
25	5,550	*1,970	*6,320	12,780	5,530	1,840	900	......	720	780	*2,880	8,060
26	2,880	1,360	6,600	12,450	5,150	2,000	780	*720	780	900	5,050	8,060
27	......	2,880	6,600	12,450	*5,150	2,000	720	580	780	......	5,800	8,060
28	*1,140	1,820	6,850	......	5,150	2,000	720	580	......	*900	5,800	8,120
29	3,700	......	7,670	*12,100	4,880	2,000	*580	550	......	980	6,850	......
30	3,700	......	8,820	11,780	4,880	2,000	580	550	*720	980	......	*7,840
31	......	......	......	......	......	......	650	650	......	980	6,850	7,840
Mean.	3,077	4,653	4,991	14,025	7,645	3,132	966	669	670	853	2,418	9,022

*Sundays.

***Mean Monthly Flow in Second-feet of Oswego River at High Dam, Oswego County, N. Y.* —(Concluded).**

[Drainage area, 5,000 Square Miles.]

DAY.	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	7,560	2,600	2,100	16,000	15,550	7,450	6,350	2,150	*1,750	1,875	2,450	*3,250
2	6,100	2,260	2,100	15,750	15,750	*7,850	6,250	2,150	2,100	1,875	2,450	4,050
3	4,640	*2,340	*2,340	15,750	15,250	8,400	5,850	2,150	2,300	1,875	*2,100	5,050
4	4,840	2,420	3,340	18,700	14,150	8,250	5,000	*1,750	2,050	1,875	1,900	4,750
5	5,860	2,260	3,060	17,850	*14,000	8,150	5,250	2,150	2,300	1,800	2,400	4,700
6	*4,640	960	2,100	17,100	13,450	8,150	5,200	2,050	2,200	*1,875	2,250	4,225
7	6,250	2,180	2,860	*16,900	12,800	7,850	*4,850	2,150	2,300	1,950	2,450	3,750
8	6,740	2,260	3,240	17,100	12,800	9,450	5,200	2,050	*1,700	1,875	2,300	*3,800
9	6,250	2,340	3,340	17,300	11,650	*10,100	5,200	2,050	2,050	1,875	2,150	4,800
10	6,520	*2,340	*3,640	17,500	11,150	9,750	4,500	2,050	1,950	1,950	*2,050	5,150
11	7,160	2,180	4,180	17,500	11,000	9,600	4,850	*1,900	1,750	1,950	1,850	5,400
12	5,940	960	4,560	17,650	*10,400	9,450	4,400	2,300	1,700	1,875	1,850	5,400
13	*7,560	920	4,640	17,650	10,850	9,000	4,300	1,700	1,700	*900	2,400	5,400
14	7,560	960	4,760	*17,500	10,400	8,550	*3,500	2,500	1,750	2,450	2,400	6,000
15	7,560	920	4,760	17,100	5,950	8,400	3,850	3,500	*1,750	2,075	2,400	*9,250
16	7,560	960	4,760	16,900	9,600	*7,850	3,400	1,625	1,950	2,050	2,800	10,400
17	8,100	*2,260	*4,760	16,900	9,450	8,000	3,100	1,550	1,950	2,150	*1,900	10,300
18	7,560	1,680	6,640	16,500	8,700	7,550	3,000	*1,250	1,950	2,400	3,850	10,150
19	2,180	1,740	6,900	15,550	*8,700	7,450	3,000	1,650	2,050	2,750	3,600	9,950
20	*3,440	1,680	7,700	16,900	8,400	7,000	2,450	1,750	2,100	*2,500	3,800	9,400
21	3,960	2,260	8,540	*17,100	8,250	7,450	*2,800	1,750	2,100	2,550	3,950	8,300
22	3,760	2,340	11,460	17,100	8,700	7,550	2,700	1,550	*1,550	2,700	3,800	*7,675
23	3,860	1,800	11,460	17,300	7,800	*7,700	2,600	1,760	1,950	2,550	3,500	8,100
24	4,610	*2,340	*11,640	17,300	6,900	8,400	2,700	1,750	1,750	2,400	*3,450	7,900
25	4,040	2,100	12,740	17,850	7,150	8,550	2,600	*1,900	1,750	2,400	4,475	.....
26	4,080	1,860	12,960	16,300	*6,600	8,250	2,850	1,950	1,700	2,200	3,800	7,750
27	*3,240	1,800	a	16,500	6,900	7,700	2,850	1,875	1,700	*2,150	3,800	7,675
28	3,510	1,740	17,650	*16,500	6,900	7,450	*2,050	1,750	1,250	2,500	3,800	7,325
29	3,340	.....	16,500	16,300	6,100	7,000	2,800	1,750	*1,150	2,400	3,800	*7,350
30	3,340	.....	16,500	16,700	7,300	*6,250	2,800	1,625	1,875	2,450	3,800	8,750
31	3,240	.....	*16,300	...	7,300	.....	2,200	1,625	.....	2,400	.....	8,320
Mean	5,326	1,874	7,270	16,967	10,006	8,152	3,740	1,928	1,871	2,150	2,901	6,806

Mean Monthly Run-off of Oswego River at High Dam, Oswego County, N. Y.

[Drainage area, 5,000 square miles.]

MEAN MONTHLY FLOW IN SECOND-FEET.

MONTH.	1897.	1898.	1899.	1900.	1901.	1902.
January	......	4,896	4,252	3,077	5,326	......
February	......	6,238	2,475	4,653	1,874	......
March	......	9,898	4,874	4,991	7,270	......
April	10,048	7,578	7,684	14,025	16,957	......
May	6,166	8,161	6,754	7,645	10,006	......
June	3,801	4,331	2,002	3,132	8,152	......
July	2,174	1,834	748	966	3,740	......
August	2,370	925	612	669	1,928	......
September	1,244	1,377	615	670	1,871	......
October	1,076	2,018	585	853	2,150	......
November	1,821	4,452	1,095	2,418	2,901	......
December	4,168	3,899	1,612	9,022	6,806	......

a Exceeds limit of rating curve. *Sunday.

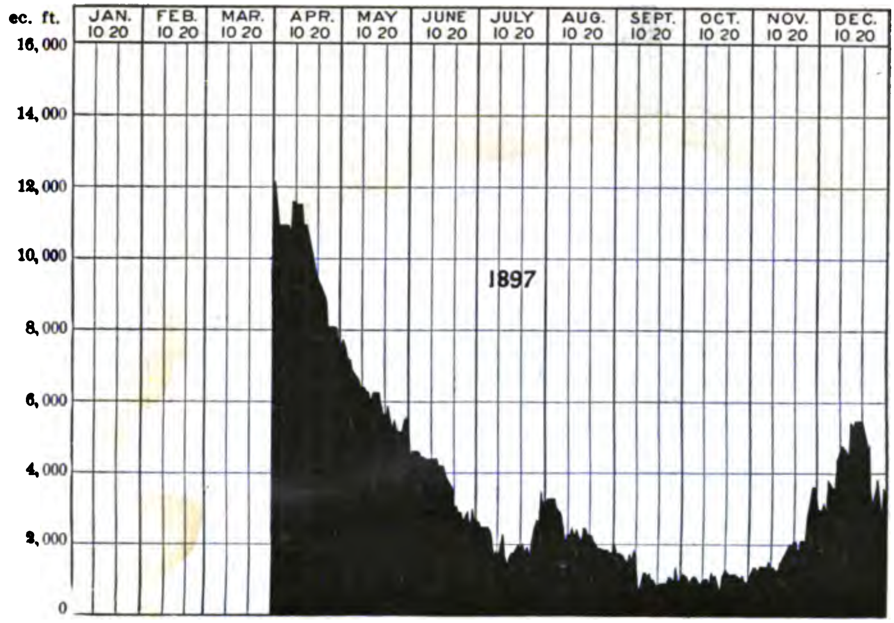
Mean Monthly Run-off of Oswego River at High Dam, Oswego County, N. Y.—(Concluded).

SECOND-FEET PER SQUARE MILE.

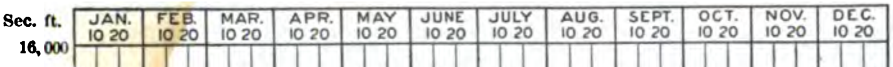
MONTH.	1897.	1898.	1899.	1900.	1901.	1902.
January	......	0.98	0.85	0.61	1.07	....
February	......	1.24	0.49	0.93	0.37	....
March	......	1.99	0.97	0.99	1.45	....
April	2.00	1.51	1.53	2.80	3.39	....
May	1.23	1.63	1.35	1.53	2.00	....
June	0.76	0.87	0.40	0.62	1.63	....
July	0.43	0.36	0.15	0.19	0.75	....
August	0.47	0.18	0.12	0.13	0.30	....
September	0.25	0.27	0.12	0.13	0.37	....
October	0.21	0.40	0.11	0.17	0.43	....
November	0.36	0.89	0.22	0.48	0.58	....
December	0.83	0.78	0.32	1.80	1.36	....

INCHES ON DRAINAGE AREA.

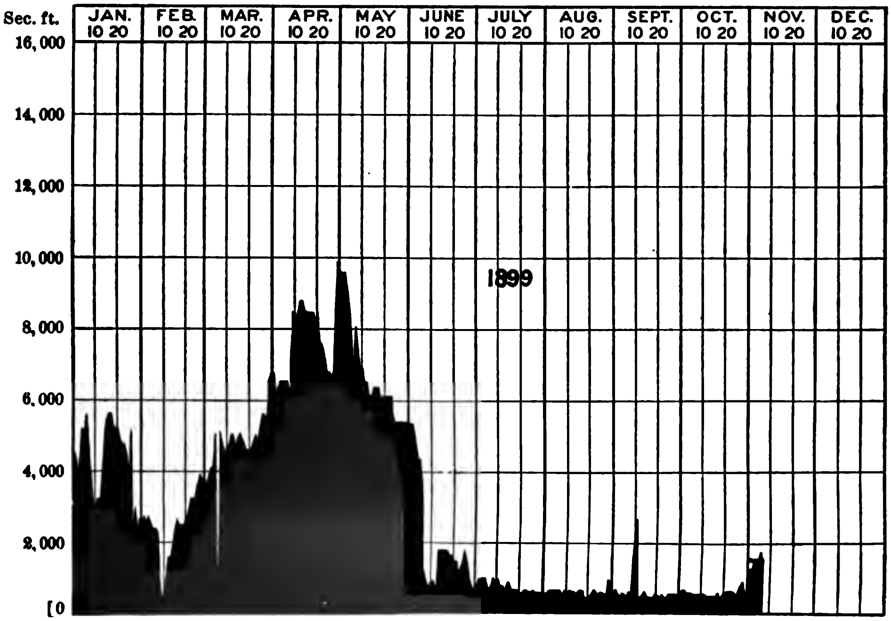
MONTH.	1897.	1898.	1899.	1900.	1901.	1902.
January	......	1.13	0.98	0.70	1.23	....
February	......	1.29	0.51	0.96	0.38	....
March	......	2.29	1.12	1.14	1.67	....
April	2.23	1.68	1.70	3.12	3.80	....
May	1.78	1.78	1.55	1.76	2.30	....
June	0.85	0.97	0.44	0.69	1.83	....
July	0.49	0.41	0.17	0.22	0.80	......
August	0.54	0.20	0.14	0.15	0.45	......
September	0.28	0.30	0.13	0.14	0.41	......
October	0.24	0.46	0.12	0.19	0.49	......
November	0.40	0.99	0.24	0.53	0.65	......
December	0.95	0.90	0.36	2.08	1.57	......



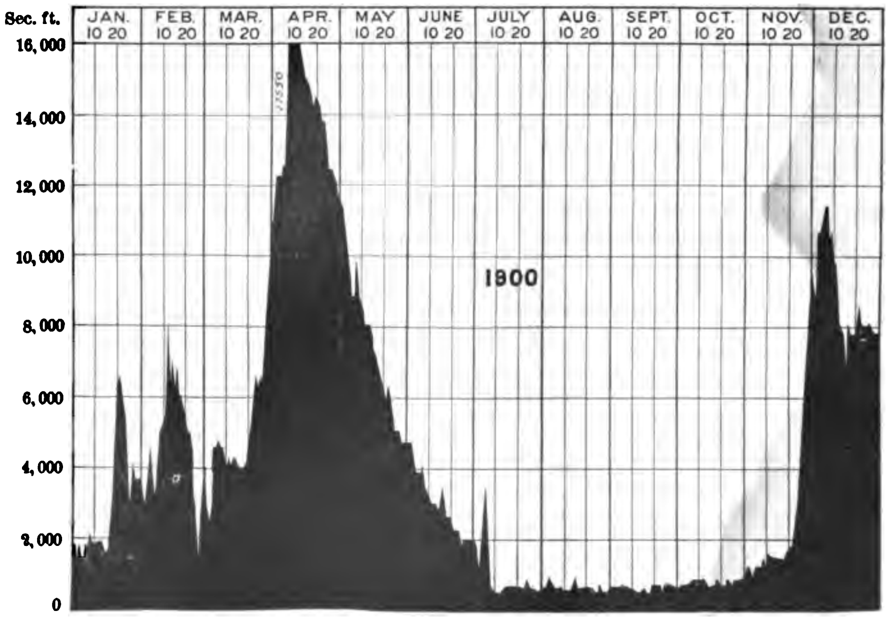
Discharge of Oswego River at High Dam, three miles from Lake Ontario at Oswego, Oswego County, N. Y., 1897.



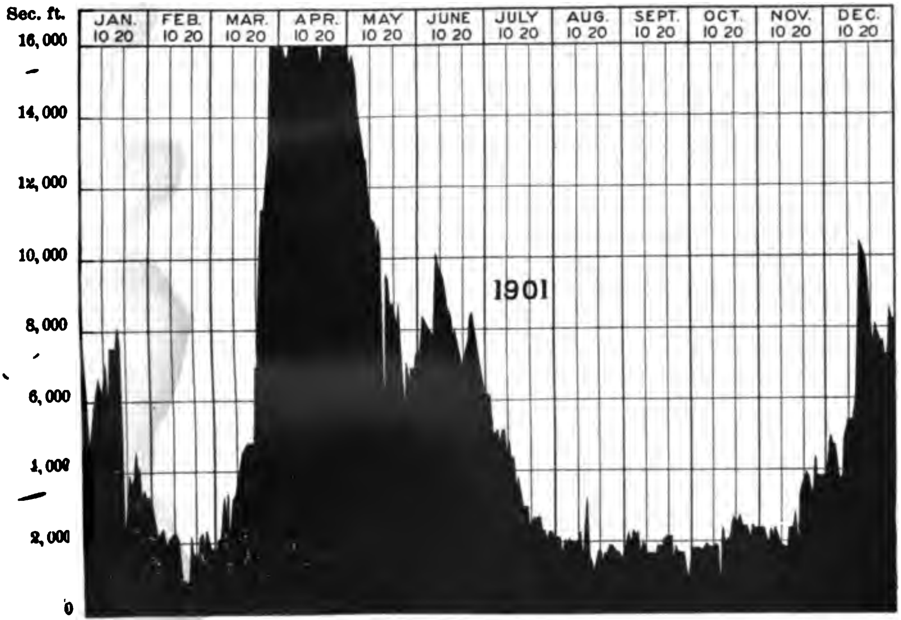
Discharge of Oswego River at High Dam, three miles from Lake Ontario at Oswego, Oswego County, N. Y., 1898.



Discharge of Oswego River at High Dam, three miles from Lake Ontario at Oswego, Oswego County, N. Y., 1899.



Discharge of Oswego River at High Dam, three miles from Lake Ontario at Oswego, Oswego County, N. Y., 1900.



Discharge of Oswego River at High Dam, three miles from Lake Ontario at Oswego, Oswego County, N. Y., 1901

GENESEE RIVER AT ROCHESTER, MONROE COUNTY, N. Y.

Genesee River rises in Potter County, Pa. It flows northerly, crossing the State of New York, and entering Lake Ontario at Charlotte. There is a total fall of 263 feet within the city of Rochester, chiefly divided between three cascades, with an aggregate abrupt pitch of 205 feet, the remaining fall being distributed between dams and rapids. There are extensive water-power developments at each fall.[a] In the vicinity of Portage the stream flows through a narrow gorge in Niagara limestone, where a total fall of 330 feet occurs. Of this about 266 feet is in three abrupt pitches. There is a descent, including rapids, of 70, 110 and 150 feet, respectively, at the three principal falls.

Beginning in March, 1893, a record has been kept of the daily elevation of water surface in the pond above Johnson and Seymour dam in Rochester. This record has been furnished by Mr. E. A. Fisher, City Engineer. The final results are not ready for publication. The following tables show a summary of the monthly variations in water level. The Johnson and Seymour dam affords power for 25 mills under a head of 19 feet. Water is drawn through two canals, one at each end of the dam. These canals take the entire flow of the stream during dry months. A State dam, a short distance upstream, diverts water for supply of Erie canal. Previous gauging records for Genesee River have been published in the reports of the State Engineer and Surveyor of New York and of United States Geological Survey as described below.

A gauge board was placed above the timber dam of the Mount Morris Hydraulic Power Company by Aug. Kibbie, and a record kept there from June 17 to December 2, 1890. The flow over the dam, which had a somewhat irregular crest 337 feet in length, was computed by the weir formula, using a constant coefficient of 3.4. An allowance of 160 second-feet was made for leakage and diversion for power purposes. The results of

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[a] Tenth U. S. Census Vol. 16, pp. 460–470; also Report of N. Y. State Engineer and Surveyor 1896, pp. 714 and 715.

Mr. Kibbie's gaugings are to be found in Report of New York State Engineer and Surveyor, 1890, Plate 11, Appendix F.

In May, 1893, a gauge was re-established at the Mount Morris dam by George W. Rafter. Diagrams showing the results of these gaugings for the period from August, 1893, to January, 1895, inclusive, and February, 1895, to November, 1896, inclusive, are to be found in the reports of the State Engineer and Surveyor, 1894, page 336, and 1896, page 644, respectively. During the summer of 1896 a sharp-edged weir was established in Genesee River, two and one-half miles below Mount Morris dam. Simultaneous observations taken at the weir and dam were used to accurately calibrate the latter for flows up to 5,000 second-feet. The Francis formula was used for calculating the flow over the weir. The corrected monthly mean flows, September, 1893, to November, 1896, inclusive, are given in the Twentieth Annual Report of United States Geological Survey, part 4, pages 225-227. The sharp edged weir at Mount Morris was injured by flood in October, 1896, and has never been repaired. The Old Mount Morris dam was carried away by high water March, 1897.

Drainage Areas Tributary to Genesee River.

LOCATION.	Square miles.
Portage Falls	1,000
Mount Morris	1,070
Rochester	2,365
Mouth	2,446

Unusual floods have occurred on Genesee River in 1815, 1835, 1857, 1865 and 1896.[a] The following are the calculated maximum rates of discharge:

Estimated Flood Discharge of Genesee River.

LOCATION.	Date.	Second-feet.	Second-feet. per square mile.
Rochester	March 19, 1865	40,000	17.0
Rochester	June 1, 1889	27,000	11.4
Mount Morris	May 2, 1894	42,000	39.2

The lesser intensity of floods at Rochester is attributed largely to surface storage due to flooding of extensive intervening flat lands bordering the river.

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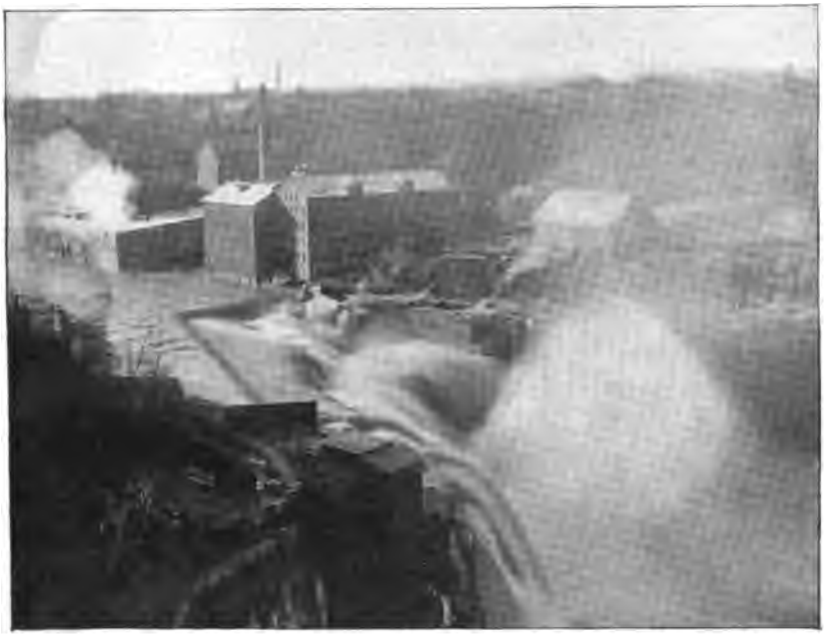
[a] Described in Report N. Y. State Engineer and Surveyor, 1896, pp. 639-644.



Genesee River Lower Falls (89 feet), Rochester, Monroe County, N. Y., 1902, during high water.

Monthly Topographical Elevation of the Genesee River at the Johnson and Seymour Dam Rochester, N. Y.

NOTE—The elevation of the crest of the Johnson and Seymour dam is 241.91.

MONTH.	1893. Maximum elevation.	1894. Maximum elevation.	1895. Maximum elevation.	1896. Maximum elevation.	1897. Maximum elevation.	1898. Maximum elevation.	1899. Maximum elevation.
Jan......	....	244.86	243.33	243.55	244.08	245.44	245.85
Feb.......	....	244.93	242.31	244.58	242.91	246.15	244.15
March....	246.41	247.04	245.24	246.96	246.13	245.55	245.17
April.....	244.65	246.08	246.26	†249.47	244.20	245.25	244.92
May......	245.78	248.34	242.43	242.49	243.86	243.85	243.09
June.....	*241.68	245.20	242.28	243.12	242.22	242.57	242.11
July.....	*240.88	242.17	241.99	242.18	242.71	242.27	*241.10
August...	244.40	242.13	*241.77	242.30	242.50	243.53	*239.40
Sept.....	243.68	245.18	*241.71	*240.73	*240.40	241.99	*240.27
October...	243.43	243.52	*239.88	245.55	*240.27	243.60	*240.38
Nov.....	243.65	243.16	242.57	242.92	242.71	245.55	242.36
Dec.....	246.36	242.85	245.29	244.18	243.75	245.85	243.75
Year ..	246.41	248.34	246.26	249.47	246.13	246.15	242.71

Monthly Topographical Elevation of the Genesse River at the Johnson and Seymour Dam Rochester N. Y.—(Continued).

MONTH.	1893. Minimum elevation.	1894. Minimum elevation.	1895. Minimum elevation.	1896. Minimum elevation.	1897. Minimum elevation.	1898. Minimum elevation.	1899. Minimum elevation.
January..	....	242.23	*241.28	*241.70	*241.15	*240.45	242.15
February	....	242.12	*240 81	242.23	*241.42	242.08	*241.85
March....	241.93	242.54	243.09	242.44	242.29	242.72	242.84
April.....	241.95	242.66	242.34	242.49	242.67	242.28	242.55
May.....	*241.76	242.34	*241.88	*241.50	242 15	242.37	242.02
June.....	*239.96	242.06	*239.22	*241.66	*239.65	*241.82	*239.42
July.....	*239.28	*240.24	*239.18	*239.61	*239.69	*239.30	*239.05
August...	*239.18	*239.85	*239.18	*239.28	*239 13	*241.15	*238.86
Sept......	*241 03	*239.26	*239.02	*239.08	*238.95	*240.12	*238.85
October .	*240.50	*240.98	*239.01	*240.95	*238.85	*240.20	*239 00
Nov.....	*241.43	242.16	*239.25	*240.91	*238.83	242.06	*240.05
Dec.......	242.26	*240.96	*239.11	*239.05	*241.39	*241.45	*240.69
Year ..	*239.18	*239.26	*239.01	*239.05	*238.83	*239.30	*238.85

Monthly Topographical Elevation of the Genesee River at the Johnson and Seymour Dam, Rochester, N. Y.

MONTH.	1893. Mean elevation.	1894. Mean elevation.	1895. Mean elevation.	1896. Mean elevation.	1897. Mean elevation.	1898. Mean elevation.	1899. Mean elevation.
January .	....	243.15	242.35	242.30	242.34	242.92	243.38
February	....	242 97	*241.42	243.12	242.50	243.37	242.45
March....	243.54	244.22	243.66	243.70	244.09	243.81	243.41
April.....	243.27	244.12	243.59	244.59	243.12	243.09	243.24
May.....	243.15	245.50	242.23	242.09	242.63	242.82	242.34
June.....	*240.80	243.05	*241.78	242.14	*241.26	242.16	*240.92
July.....	*239.95	*241.33	*240.28	241.94	*241.50	*240.70	*240.03
August ..	*239.67	*241.39	*240.30	*240.69	*239.64	242.20	*239.10
Sept.....	242.12	*241.86	*239.43	*239.51	*239.32	*241.08	*239 25
Oct......	241 81	*241.85	*239.23	242.59	*239.22	*241.71	*239.51
Nov.....	242.09	242.61	*240.83	242.06	*240.69	242.87	*241.60
Dec......	243.44	242.22	*241.53	242.16	242.19	242.63	242.36
Year ..	241.98	242.85	*241.38	242.24	*241.54	242.45	*241.47

* Elevation of water below crest of dam.

† Highwater of April 1, 1896.

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ST. LAWRENCE DRAINAGE BASIN.

St. Lawrence River receives the drainage from a number of important watersheds in northern New York. Its streams have their headwaters in the northwestern slope of the Adirondacks, where numerous lakes and ponds conserve a large portion of the naturally heavy precipitation.

There are five main streams, Oswegatchie, Grasse, Raquette, Salmon and Chateaugay rivers, which flow in a northwesterly direction in courses more or less parallel. Important waterfalls occur in several of the streams near the points where they emerge from the Adirondacks, and fall over ledges of gneiss, standstone and granite onto the drift filled plains below.

Oswegatchie and Raquette Rivers are described in connection with gaugings on these streams. Grasse River drains a long, narrow watershed lying intermediate between Oswegatchie and Raquette Rivers. The channel of Grasse River is parallel to St. Lawrence River throughout the lower 18 miles of its course. For several miles of this distance it is separated from the St. Lawrence by a neck of land not exceeding four miles in width. Within this distance occurs the Long Sault rapids of St. Lawrence River, comprising a fall of 45 to 50 feet. This fact has been taken advantage of for the construction of a great hydraulic power plant by the St. Lawrence Power Company. A canal 3½ miles in length has been cut across the divide opposite Massena by which water is diverted from near the head of Long Sault Rapids to a power plant situated on the bank of Grasse River. Thirty-five thousand horse power is developed, under a head of 42 feet. The spent water is turned into Grasse River, which is used as a tail-race.[a]

Owing to its lack of storage, water power on Grasse River is of less importance than on its neighboring streams, Oswegatchie and Raquette Rivers. At Chase Mills a power exists, giving a fall of 8 feet, which it is stated, could be increased to 30 feet by the construction of a suitable dam which would back water to the head of Chamberlain Rapids, some distance upstream. Below Russell an undeveloped power exists, where, it is stated, a fall of 25 feet could be obtained.

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[a] Full descriptions are given in Engineering News Feb. 21, 1901, pp. 130-132, and in a pamphlet, "The St. Lawrence Power Company of Massena, New York," issued by the company.

Grasse River has a drainage area above Canton of 113 square miles, and of 637 square miles above its mouth. The stated high water marks at Chase Mills indicate a maximum discharge of 4,700 second-feet in the spring of 1897. The drainage areas of other streams tributary to St. Lawrence River are given below:

STREAM.	Square miles.
West branch St. Regis River above junction of branches	280
East branch St. Regis River above junction of branches	347
St. Regis River below junction of two branches	627
Deer River above junction with St. Regis River	212
St. Regis River above mouth	910
Little Salmon River above junction with Salmon River	103
Salmon River above Malone	179
Salmon River above Little Salmon River	273
Salmon River below junction with Little Salmon River	452
Salmon River above mouth	480
Trout River above New York State line	129
Chateaugay River above New York State line	199

Principal Developed Water Powers on Grasse River.

No. of dam.	No. of mills at dam.	LOCATION.	HEAD IN FEET.			Number of employes.	Use made of power.
			Greatest.	Least.	Average.		
1	3	Massena	8	7½	8	8	Grist and planing mills.
2	2	Lewisville	9	5	7	6	Grist and saw mills.
3	1	Chase Mills	8	8	8	2	Custom saw mill.
4	5	Madrid	9	5	7	57	Clothing, feed and saw mills.
5	1	Bucks Bridge	9	8	8½	50	Saw mill.
6	4	Morley	8	3	6	8	Woodworking and feed mills.
7	4	Canton	12	6	9	.....	Grist, saw mills, foundries, etc.
8	1	Canton	.....	.....	.....	.....	Saw mill.
9	1	Pyrites	.....	.....	65	.....	Sulphite pulp mill.
10	2	Russell	10	6	8	8	Woodworking and grist mills.
		Water power on Little River.					
1	1	Little River	.....	.....	12	.....	Saw mill.
2	1	Little River	.....	.....	14	3	Woodworking and grist mills.
3	1	Little River	.....	.....	14	.....	Grist mill.
4	1	Little River	.....	.....	12	.....	

OSWEGATCHIE RIVER.

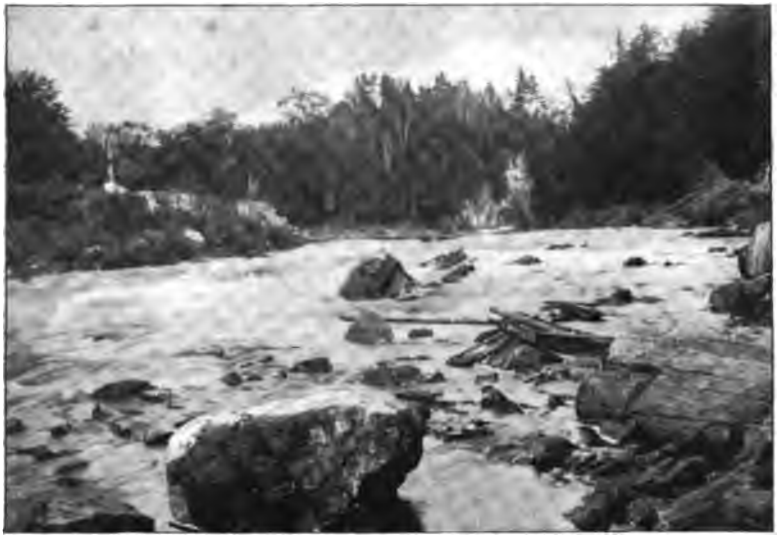
This stream has its source in a region of lakes and timbered swamps in southern St. Lawrence county. The largest of the lakes is Cranberry Lake, which affords valuable storage to water power users on its outlet, East branch Oswegatchie River. The east and west branches flow in a general direction northwesterly. The two branches join near Talcville. From Gouverneur to Oxbow the river flows southwest. It then turns abruptly to the northeast. At Galilee it is joined by the outlet of Black Lake, and finally enters St. Lawrence River at Ogdensburg.

Drainage Area of Oswegatchie River.

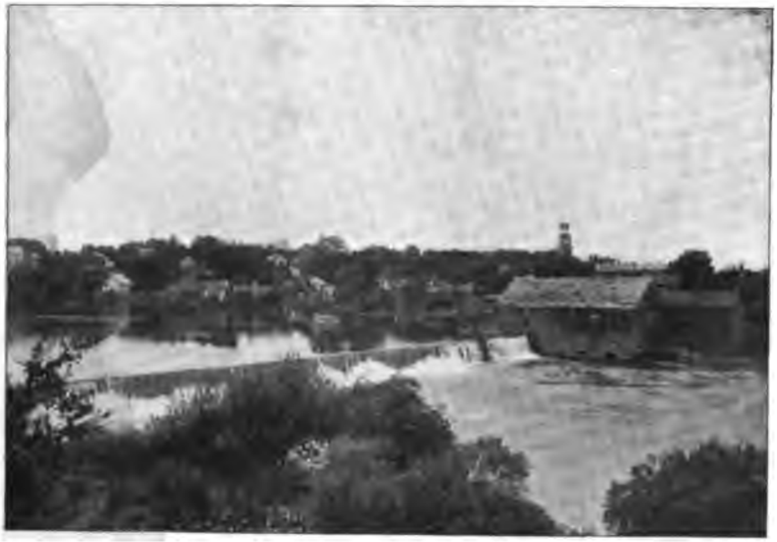
LOCATION.	Square miles.
East branch Oswegatchie River above mouth	358
West branch Oswegatchie River above mouth	272
Oswegatchie River below junction of two branches	630
Oswegatchie River above Gouverneur	727
Oswegatchie River above Galilee	1,033
Indian River above Philadelphia	216
Black lake watershed above Galilee	544
Oswegatchie River below Black Lake junction	1,577
Oswegatchie River above Ogdensburg	1,609

Cranberry Lake has a water surface area of 12.8 square miles. Storage is developed by a federation of the water power users below. Black Lake, having a water surface area of 17.2 square miles, aids to regulate the flow at Ogdensburg. Opportunity for storage is presented on Indian River by Indian and Bonaparte Lakes. Storage is maintained on Lake Bonaparte as a private enterprise, water power users below paying for the use of the water during the dry season.

The first water power on the stream is at Ogdensburg. The dam is of timber, originally constructed in 1796. With the exception of the Ogdensburg city pumping station on the right bank, power is transmitted to the mills through an open hydraulic canal. The power is partitioned into 101 privileges, of which 26 are termed first-class and 75 second-class. Of these, 62 are in use, this number including all the first-class privileges. In 1872, the Supreme Court was called upon to define the rights



Oswegatchie River. Dam sight at Wegatchie, St. Lawrence County, N. Y.



Oswegatchie River. Ogdensburg, St. Lawrence County, N. Y.

of the several claimants. A system of weirs with movable crests was established. One being placed at the entrance to each penstock. Over these weirs the water must pass in order to reach the turbines. The head is never allowed to go below 8 feet. During low water, excessive draught is prevented by raising the weirs. The crests of the weirs for second-class privileges are kept 1.5 feet above those for first-class. A standard form of weir is used for all provileges, the weirs having a crest length of 4 feet.

One first-class privilege is accepted as being 32 second-feet under the existing head, or 29 horse-power theoretical, under the minimum head of 8 feet. The total power provided for is 754 theoretical horse-power. This would require a minimum flow of the stream of 928 second-feet.

The maximum reported high-water of Oswegatchie River at Ogdensburg dam, produced a depth of 5.5 feet on the crest of the dam, corresponding to an estimated discharge of 15,500 second-feet, or 9.6 second-feet per square mile.

At Heuvelton, above Black Lake inlet, the estimated discharge from the reported high-water marks is 9,019 second-feet or 9.7 second-feet per square mile.

A current meter measurement of the low-water flow of Oswegatchie River at Eel Weir Bridge, 6 miles above Ogdensburg, was made September 25, 1900; the discharge was found to be 614 second-feet, or 0.4 second-foot per square mile. At Heuvelton the measured discharge on September 26, 1900, was 804 second-feet or 0.8 second-foot per square mile from the tributary drainage area of 1,027 square miles.

The discharge of Indian River at Town Line Bridge, above Philadelphia, was 28.5 second-feet on September 28, 1900. On East branch Oswegatchie River, above Oswegatchie, are three undeveloped powers, capable of affording falls of 60, 20, and 20 feet respectively, by the construction of low diverting dams on their crests.

Six miles above Harrisville, on Middle Branch Oswegatchie River, occurs a series of seven or eight falls, including Jerden and Kilburn Falls. Among these is Sluice Falls, where the stream goes around an abrupt headland in a narrow channel, having a nearly precipitous descent of about 100 feet.

At Rensselaer Falls, Oswegatchie and Grasse Rivers are separated by a low lying swampy plain, draining in both directions through a so-called "natural canal."

Most of the powers of the Lower Oswegatchie watershed have been developed by the construction of timber dams on the crests of natural rifts, and there is very little opportunity for increasing the power except by centralizing the plants in single stations and installing more modern and highly efficient turbines.

At Gouverneur a natural fall of 3 feet over rocks has been increased to 8 feet by the construction of a dam. The mills are distributed in a row across the stream channel; each apparently being intended by the original partitioner to have the use of so much water as flowed over the section of the stream channel he occupies. Above Gouverneur the power is chiefly utilized for the pulverization of talc in the production of mineral fibre.[a]

At Theresa, on Indian River, power is developed under a head of 20 feet, capable of increase to 35 feet; similarly, at Philadelphia, on the same stream, the existing head of 27.5 feet is capable of increase to 40 feet.

Arrangements have been made for a current meter station on Oswegatchie River at Eel Weir Bridge, six miles above Ogdensburg.

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[a] See The Talc Industry of St. Lawrence County, C. H. Smyth, Jr., in Report N. Y. State Museum, 1895; pt. 11, pp. 661-671.

Oswegatchie River East Branch: At Newton Falls, St. Lawrence County, N. Y.

Raquette River Gauging Station: Dam of Electric Power Company at Hannawa Falls, St. Lawrence County N. Y.

Principal Developed Water Powers on the Oswegatchie River.

Number of dam.	Number of mills at dam.	LOCATION.	HEAD IN FEET.			Number of employes.	Use made of power.
			Greatest.	Least.	Average.		
1	17	Ogdensburg	12	4	8	336	General manufacturing.
2	2	Heuvelton	8	8	8	5	Woodworking and grist mill.
3	3	Rensselaer Falls	8	7	7½	31	Saw mills and custom mills.
4	1	Coopers Falls	.....	.....	8	......	Saw mill privileges.
5	4	Wegatchie	.....	.....	11	......	Abandoned woolen mill. Saw mill; runs in winter.
6	1	Natural Dam	.....	.....	19½	150	Saw and paper mills.
7	7	Gouverneur	9	4	7	82	General manufacturing.
8	1	Hailsboro	.....	.....	.....	......	Talc pulp.
9	1	Hailsboro	.....	.....	.....	......	Talc pulp.
10	2	Hailsboro	.....	.....	12	4	Wood-working mills. Custom grinding.
11	1	Hailsboro	.....	.....	18	......	Talc pulp.
12	1	Hailsboro	.....	.....	20	1	Oswegatchie Light and Power Co.
13	1	Emeryville	.....	.....	31	33	Gouverneur Wood Pulp Co.
14	1	Dolgeville	.....	.....	16	11	U. S. Talc and Pulp Co.
15	1	Talcville	.....	.....	12	1	Talc mine.
16	2	Edwards	.....	.....	12	10	Grist and saw mills.
17	......	South Edwards	.....	.....	.....	......	
18	1	Fine	.....	.....	.....	......	Saw and paper mills.
19	1	Oswegatchie	38	30	34	......	Standard Pulp Co.
20	1	Newton Falls	.....	.....	20	150	Wood pulp.
21	1	Newton Falls	.....	.....	38		Wood pulp paper.
		Water Power on the West Branch.					
1	1	Below Fullerville	.....	.....	13	5	Talc pulp.
2	1	Fullerville	.....	.....	12	......	Iron works (abandoned)
3	1	Fullerville	.....	.....	19½	20	Wood and talc pulp.
4	1	Gears Corners	10	8	9	......	Saw mill (abandoned).
5	1	Harrisville	.....	.....	13	3	Grist mill.

RAQUETTE RIVER.

Raquette River drains a long, narrow watershed extending from northern Hamilton county to St. Lawrence River. Above Piercefield the drainage basin broadens out, including a region interspersed with lakes and ponds and affording ample opportunities for storage development,[b] as shown by the following list of lakes:

LAKE.	Surface area, square miles.	Drainage area, square miles.
Blue Mountain Lake [a]	3.9	39.26
Raquette Lake	8.3	93.9
Forked Lake	2.5	30.8
Long Lake	4.7	152.2
Little Tupper Lake	8.0	59.3

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[a] Including Eagle and Utowana Lakes.

[b] Described in Report on A Survey of Upper Hudson and Raquette rivers, Farrand N. Benedict, 1872.

The upper plateau of Raquette River watershed is comparatively flat. Where the outflowing stream reaches the outcrop of granitic gneiss, forming the northwestern boundary line of the Adirondack region, it wears its way downward very slowly. From above Colton Falls to Hannawa Falls, a distance of 5 miles, a total fall of 385 feet occurs. With the exception of an old mill at its head, the upper portion of this fall is undeveloped.

Much of the fall occurs in passing a deep, narrow gorge mostly in Potsdam sandstone, affording both excellent sites and materials for dams. The most rapid descent is at Colton, where a fall of 100 feet occurs in a series of short cascades.

Going upstream, there are additional opportunities for power development at Higley Falls, South Colton Falls, and at Rainbow, Gaintwist, Leonard, Starks, Carry and Raquette Falls. These latter are in the heart of the timbered region of the Adidondacks, and, lacking railroad facilities, are of little present importance. At Piercefield Falls, where the stream is crossed by the Adirondack Division of the N. Y. C and H. R. R. R., is an important power development in connection with lumber industries.

Drainage Areas of Raquette River.

LOCATION.	Square miles.
Above Fiercefield	695
Above Hannawa Falls	967
Above Massena Springs	1,188
Above mouth	1,240

In connection with the development of water power at the lower descent of 84 feet at Hannawa Falls, a gauging record has been established to determine the total flow of the stream past the dam and power plant. The gauging record was started September 1, 1902; readings are taken twice daily by Wilson Gilman, C. E. The dam is constructed of Potsdam red sandstone, with an ogee shaped cross section. The length of the crest of the overflow is 234.5 feet. Water is carried along the top of the bluff at the right of the dam through an open

Raquette River. Higley Falls above Colton, St. Lawrence County, N. Y.

Raquette River. Upper Falls at Colton, St. Lawrence County, N. Y.

earth canal 2,700 feet in length. The power canal terminates in a forebay from which the water is conducted to the turbines in the power house, at the foot of the cliff, through 6-foot steel penstocks. The turbines are a specially built wheel of the Samson type, constructed by James Leffel & Company, of Springfield, Ohio; two runners being placed horizontally on the same shaft. The records kept for determining the volume of flow include, depth flowing over spillway, the discharge through waste gates, and the water used to drive the turbines.

The pond formed by the dam affords a storage surface of about 200 acres.[a]

A current meter measurement was made at Potsdam, N. Y., by Wallace C. Johnston on August 28, 1898, which probably showed the extreme low-water flow for that year, which was 755 second-feet.

A current meter measurement at Massena Springs Highway bridge October 2-3, 1900, showed the low water flow of Raquette River at that time to be 934 second-feet, or 0.78 second-foot per square mile.

Water power has been developed on Lower Raquette River at Norfolk, by carrying water around existing dams over a long rapid, so as to obtain a total fall of 32 feet. The power obtained will be used in the manufacture of paper. At Norwood a power exists where 8-foot head is now obtained, which could be re-developed so as to afford a total fall of 25 feet with extensive pond storage.

LAKE CHAMPLAIN OUTLET AT FORT MONTGOMERY, CLINTON COUNTY, N. Y.

Lake Champlain drains an area of 7,750 square miles, of which the major portion lies in the State of New York. The center line of the lake forms the boundary between New York and Vermont. The foot of the lake is situated at Rouse Point, near the Canadian boundary line. Richelieu River, the outlet of the lake, is 75 miles in length. It flows northerly across the Province of Quebec and enters St. Lawrence River at Sorel. The lake has a water surface area of 437 square miles. It receives the drainage from the northeast slope of the Adirondacks. The principal tributary streams in New York are Chazy, Saranac and Ausable rivers. A record of the elevation of lake surface at Rouse Point has been kept by the U. S. Corps of Engineers, at Fort Montgomery, beginning 1875.

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[a] This plant is described in Engineering Record, December 7, 1901, pp. 546-549.

Through the courtesy of Capt. Harry Taylor, the guage readings taken by Wm. McComb at 9 a. m. each day are reported weekly to the U. S. Geological Survey.

In 1896 the construction of the dam and power plant at Chambly was begun for the Royal Electric Company of Montreal.[a] The dam is of concrete masonry, strengthened with imbedded bent iron bars. It has an ogee cross section, a vertical upstream face, and a crest 6 feet wide, sloping downward from the lip to the upstream edge 2 inches per foot. The height of the dam from apron to crest is 18 feet, and it affords a fall of 28 feet at the power-house. A calibration curve of Richelieu River was calculated by the United States Board of Engineers on Deep Waterways, by comparing the computed discharge over this dam with the corresponding stage of Lake Champlain at Fort Montgomery, taking into consideration the slope of Richelieu River in the intervening distance of 35 miles from Rouse's Point to Chambly. From this curve the discharge in second-feet, corresponding to the observed stages of Lake Champlain at Fort Montgomery, has been deduced.[b]

Elevation of Lake Champlain at Fort Montgomery, N. Y.	Discharge of Richelieu River at Chambly, P. Q.
Feet.	*Second-feet.*
94	5,000
95	8,500
96	12,000
97	15,500
98	19,500
99	24,000
100	29,500
101	36,000

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[a] Described in Engineering Record, June 17, 1899; pp. 50–51.

[b] Report of U. S. Board of Engineers on Deep Waterways, pt. 1, pp. 321–328.

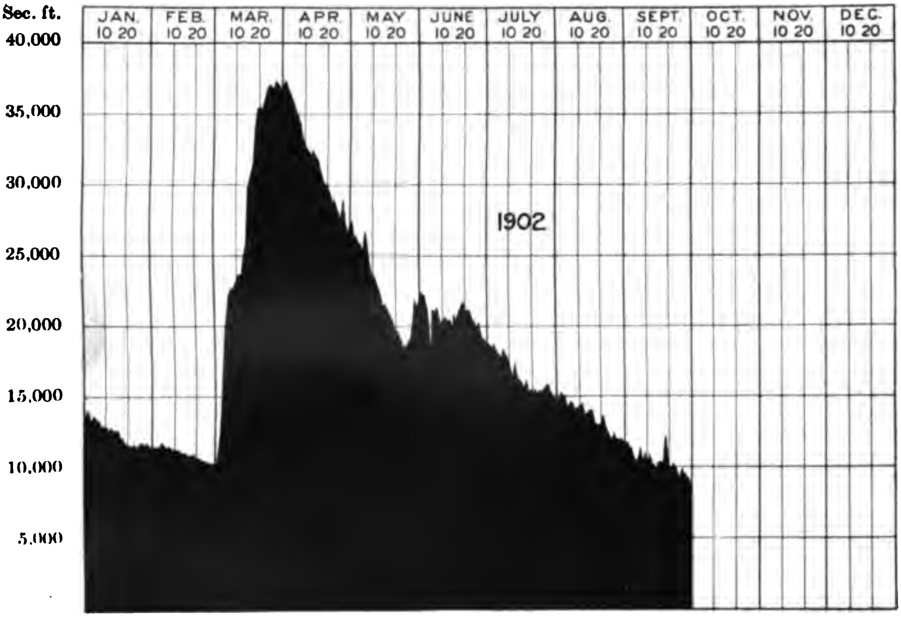
Mean Daily Discharge in Second-feet of Richelieu River at Chambly, P. Q.

[Drainage area, 7,750 square miles.]

DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1....	......	10,100	9,760	13,980	30,530	17,610	10,440	8,400	5,680	4,490	5,340	9,080
2....	......	10,100	10,100	13,980	31,150	17,120	10,270	8,740	5,850	4,660	6,020	8,740
3....	......	10,100	10,270	13,600	30,840	16,830	10,100	8,230	......	4,830	7,720	......
4....	......	10,100	10,950	13,600	30,840	16,640	......	8,060	5,680	5,340	8,910	9,080
5....	......	......	......	13,600	30,840	16,450	10,100	7,890	6,870	4,490	......	9,250
6....	......	9,930	11,120	13,790	30,530	16,260	9,080	......	4,490	5,000	8,910	9,180
7....	......	9,760	11,460	13,980	29,600	15,880	9,760	7,380	5,170	4,660	9,230	9,420
8....	......	9,420	12,340	14,740	28,730	15,560	9,760	7,040	4,830	......	9,420	8,570
9....	......	9,420	12,520	......	27,860	15,120	......	7,210	4,660	5,000	9,590	8,740
10....	......	9,250	12,880	16,830	27,570	14,740	10,270	7,210	......	4,830	9,420	......
11....	......	9,080	13,240	17,610	28,440	......	10,270	7,550	6,190	5,170	9,250	9,080
12....	......	......	......	17,400	26,180	15,120	10,440	7,720	6,020	4,660	......	10,100
13....	......	9,250	13,600	18,450	26,440	14,740	10,270	......	4,320	4,490	9,420	10,270
14....	......	9,080	13,600	19,080	24,620	13,790	9,930	6,700	4,150	4,440	9,350	10,780
15....	......	9,420	14,360	20,380	24,100	13,980	9,250	6,700	3,980	......	10,270	11,630
16....	10,440	9,420	13,980	21,480	25,860	13,060	.....	6,870	4,660	4,490	8,910	11,800
17....	10,780	9,420	14,360	22,660	25,380	13,060	9,750	6,700	......	5,680	9,250	......
18....	10,610	9,420	14,740	25,380	25,860	......	9,420	6,700	4,320	3,980	10,610	12,160
19....	10,780	9,250	......	25,860	22,420	12,880	9,250	6,530	3,470	4,320	......	11,800
20....	10,780	9,250	14,740	25,140	21,700	13,060	9,420	......	3,640	3,980	9,080	12,260
21....	10,610	9,250	15,120	25,660	20,820	11,800	9,930	6,360	3,980	3,810	9,080	13,240
22....	......	10,100	14,740	26,700	20,950	11,800	9,250	6,700	4,660	3,640	9,420	12,880
23....	10,610	9,420	14,740	27,280	20,600	12,880	......	6,530	5,860	4,490	9,080	13,790
24....	11,290	9,590	14,740	28,150	20,160	12,160	9,420	6,700	6,700	4,320	9,080	......
25....	10,440	9,760	14,740	28,730	19,940	......	9,590	6,530	5,680	4,320	9,080	13,420
26....	11,120	......	......	29,310	19,720	11,630	9,250	6,530	4,820	4,150	......	12,880
27....	10,270	10,100	14,550	29,724	17,400	11,460	8,740	......	5,170	3,810	9,160	12,880
28....	10,610	10,270	14,360	30,530	18,660	10,780	8,910	6,020	5,680	4,320	9,250	12,700
29....	10,440	......	14,170	30,530	19,500	10,610	8,910	4,285	6,020	......	8,570	12,340
30....	10,440	......	14,360	30,530	17,400	10,440	......	4,320	5,170	4,490	9,080	12,160
31....	10,270	......	14,170	......	17,820	......	8,400	6,190	......	5,000	......	......
Mean	10,630	9,618	13,322	21,678	24,595	13,903	9,622	6,877	5,174	4,531	8,942	11,432
1900.												
1....	11,800	11,120	17,400	19,690	34,350	21,480	13,600	9,930	8,060	6,360	7,210	13,240
2....	11,800	11,120	17,310	15,880	35,670	22,420	13,420	9,930	8,740	6,530	6,530	13,240
3....	11,630	11,460	17,120	16,260	33,690	......	14,170	9,420	9,080	6,870	6,190	13,420
4....	11,800	11,120	......	17,120	32,700	22,420	13,240	9,250	8,230	6,700	6,700	13,240
5....	11,630	10,950	17,120	18,240	38,450	22,660	12,880	......	8,230	6,700	6,190	13,600
6....	10,950	11,120	17,310	18,240	......	22,660	13,060	9,080	7,720	6,360	6,020	14,170
7....	......	11,460	17,120	19,080	36,700	22,420	12,880	9,420	7,380	8,400	6,870	14,930
8....	10,440	11,460	17,120	......	36,350	21,940	......	9,760	7,720	6,530	6,020	14,360
9....	10,780	11,460	16,830	20,820	36,000	20,820	12,520	9,250	......	6,360	5,680	13,980
10....	10,950	11,800	13,980	21,260	35,670	20,380	12,520	9,760	7,040	6,360	6,190	14,360
11....	10,270	11,980	16,260	21,480	28,730	......	12,700	9,250	7,550	6,190	6,530	14,360
12....	10,440	12,160	16,070	21,700	28,730	19,720	12,340	9,080	7,890	6,530	7,040	14,170
13....	10,270	12,520	16,270	21,700	......	20,160	12,160	9,420	6,870	6,530	6,700	15,120
14....	......	15,310	15,880	22,420	27,860	20,600	11,800	9,590	6,700	6,530	7,040	13,790
15....	10,100	16,260	15,880	......	26,700	18,660	......	9,930	6,700	6,530	7,210	13,790
16....	9,930	17,310	15,790	22,900	26,700	18,450	11,980	9,930	......	7,210	6,870	13,600
17....	9,760	17,610	15,880	25,380	26,700	......	11,290	9,250	6,700	6,530	7,550	13,600
18....	10,440	......	16,180	24,880	26,180	17,820	11,460	9,760	5,850	6,530	7,890	13,540
19....	9,930	18,030	15,690	26,440	25,920	17,400	11,120	......	6,360	6,190	7,040	13,240
20....	10,270	17,820	15,500	29,600	......	17,120	11,460	9,420	7,380	6,530	7,550	13,240
21....	10,100	17,730	15,420	31,770	26,440	17,120	12,340	9,250	7,040	6,700	9,250	13,240
22....	11,120	17,400	15,690	33,360	26,180	16,830	......	9,420	6,700	6,530	9,420	13,060
23....	11,220	17,530	15,310	34,680	25,920	16,450	11,050	9,250	......	6,360	10,270	13,600
24....	10,610	17,820	15,880	35,670	25,400	......	10,780	9,590	6,360	6,530	10,730	12,700
25....	11,800	17,400	15,690	36,350	25,140	15,880	10,610	9,080	6,530	6,360	11,290	13,420
26....	11,200	17,400	15,500	36,700	24,880	16,070	10,440	8,910	6,700	7,040	11,460	13,420
27....	11,290	17,310	15,500	36,700	......	15,310	10,610	8,740	6,360	6,530	11,980	......
28....	......	17,120	15,500	36,350	25,620	14,550	10,440	8,570	6,190	6,700	12,520	......
29....	11,460	......	15,500	......	25,140	14,550	......	8,740	7,040	6,530	13,240	......
30....	11,630	......	15,310	35,670	22,900	14,550	10,270	8,400	6,700	5,850	12,880	13,420
31....	11,460	......	15,310	....	22,420	......	11,120	8,230	......	6,870	......	13,240
Mean	10,900	14,510	16,045	22,242	18,040	18,786	12,014	9,300	7,178	6,593	8,037	13,327

Mean Daily Discharge in Second-feet of Richelieu River at Chambly, P. Q.—(Concluded.)

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1....	12,700	10,780	9,080	18,240	35,340	25,620	16,830	10,780	8,570	6,700	6,190	6,360
2 ...	13,060	10,780	8,910	18,660	37,050	25,380	17,120	10,780	8,500	7,720	5,680	6,530
3....	12,700	10,610	......	18,870	33,030	25,380	15,880	10,950	8,740	6,360	6,020	6,020
4....	12,880	10,440	9,080	19,290	33,690	25,140	15,690	10,480	8,740	6,020	6,700	6,020
5....	12,700	10,610	8,740	20,380	32,700	25,140	14,550	10,100	8,910	6,020	5,680	6,020
6....	12,700	10,270	8,570	21,700	32,700	22,900	15,600	10,100	8,740	5,170	5,510	6,190
7....	12,700	10,440	8,740	25,620	32,590	22,420	15,120	10,440	8,400	6,020	5,680	6,360
8....	12,340	10,270	8,570	26,180	31,460	22,660	14,360	10,950	8,060	6,360	5,680	6,360
9....	12,160	10,100	8,500	29,600	30,530	21,940	14,550	10,100	7,890	6,190	5,850	6,530
10....	11,980	10,100	8,400	31,460	29,910	21,940	14,360	11,460	8,060	6,020	4,830	6,530
11....	11,800	10,100	8,570	31,770	29,310	22,180	13,790	10,440	7,720	5,680	5,680	6,700
12....	12,160	10,100	8,740	32,700	28,540	21,700	13,600	10,270	7,720	6,360	6,020	7,210
13....	11,980	9,930	8,570	32,700	28,730	21,260	13,420	10,270	7,720	6,700	4,660	8,060
14....	11,980	9,930	8,740	33,030	28,440	21,260	13,600	10,780	7,720	5,850	5,680	8,400
15....	11,800	9,760	8,740	33,360	27,860	20,820	13,240	10,950	8,400	6,360	5,850	9,590
16....	12,340	9,930	8,570	34,020	26,700	20,380	13,600	10,100	8,060	6,700	6,020	11,800
17....	11,630	9,760	8,740	34,020	26,180	19,720	13,240	10,100	7,550	6,360	6,020	13,420
18....	11,460	9,680	8,910	35,670	25,920	19,500	12,880	9,930	7,380	6,190	5,850	13,980
19....	11,460	9,590	8,740	34,550	25,660	19,290	12,340	9,930	7,380	8,060	5,680	14,170
20....	11,800	9,420	8,740	34,020	26,180	19,080	12,160	9,760	7,380	6,190	5,850	14,360
21....	12,700	9,420	9,080	35,340	26,180	19,290	12,520	9,590	7,210	6,190	6,020	13,980
22....	11,460	9,420	9,760	35,340	26,180	19,080	11,800	10,100	8,060	6,190	6,360	14,740
23....	11,460	9,420	10,270	36,000	26,180	18,660	11,630	10,440	7,380	6,360	5,680	14,360
24....	11,460	9,690	11,120	36,700	25,400	18,550	11,460	9,590	6,190	6,700	6,020	14,360
25....	11,290	9,590	11,290	36,700	25,400	18,450	11,290	9,080	6,020	5,850	5,510	13,980
26....	11,120	9,490	12,340	37,050	25,140	18,450	11,120	9,080	6,360	7,720	5,170	13,980
27....	11,120	8,250	13,790	37,050	24,720	18,240	10,780	9,080	6,360	5,850	5,340	13,790
28....	11,220	9,080	15,880	36,700	24,620	18,030	11,120	8,910	6,700	6,020	5,510	13,790
29....	11,290	......	16,450	36,000	24,100	17,610	10,780	9,080	6,190	6,360	6,020	13,980
30....	11,120	......	17,120	35,670	25,860	17,400	10,780	9,420	6,020	6,700	5,680	13,980
31....	10,950	......	17,400	......	25,140	......	11,120	8,740	......	6,700	......	13,790
Mean	11,920	9,888	10,338	30,613	28,433	20,939	13,236	10,057	7,604	6,377	6,082	10,463
1902.												
1....	13,240	11,460	10,610	37,400	26,440	22,180	18,660	14,740	11,630	9,080	10,270	10,440
2....	13,980	11,460	12,160	36,700	26,180	21,700	18,450	15,120	11,290	8,570	10,950	10,100
3....	13,240	11,460	15,880	36,350	26,440	21,040	18,660	14,930	11,290	8,740	11,290	10,610
4....	13,240	11,460	19,500	36,000	26,180	17,820	18,240	14,360	10,440	8,400	10,950	9,760
5....	13,600	11,630	21,260	35,340	25,920	21,260	18,030	14,170	10,270	8,910	10,950	9,420
6....	13,240	11,460	22,180	35,010	25,140	21,040	17,610	14,550	10,610	8,570	11,980	9,930
7....	13,240	11,460	22,660	34,350	26,700	21,480	18,450	14,360	11,290	9,420	10,850	10,440
8....	12,880	11,290	22,660	33,360	25,140	20,160	17,820	13,980	10,440	8,570	10,440	10,100
9....	12,880	11,290	23,140	31,770	24,100	20,380	17,400	14,170	10,950	8,400	10,610	9,760
10....	12,700	11,290	23,380	32,390	23,380	20,380	16,640	14,170	10,100	8,400	10,100	10,950
11....	12,520	11,120	23,620	32,390	23,620	20,600	16,260	14,360	10,780	9,420	10,270	9,420
12....	12,520	11,120	23,620	32,080	23,140	20,160	17,400	13,790	10,270	8,060	12,160	9,420
13....	12,700	10,950	25,140	32,390	22,660	20,380	16,450	13,600	......	9,080	10,440	9,420
14....	12,340	10,950	27,860	32,080	21,700	19,940	16,070	13,790	9,930	8,230	10,100	9,590
15. ..	12,520	10,950	29,910	31,770	21,700	20,820	15,880	13,420	10,270	8,910	10,950	9,420
16....	12,340	10,780	......	31,150	21,700	20,380	15,310	13,420	10,100	8,060	10,440	13,790
17....	11,980	10,780	31,460	30,220	21,040	21,040	16,070	13,060	10,100	8,230	10,440	10,610
18....	12,160	10,780	34,020	29,910	20,600	21,260	15,120	12,880	12,160	8,570	11,290	9,590
19....	11,630	10,610	35,010	29,910	20,380	21,700	15,310	12,880	9,930	8,570	11,120	9,930
20....	11,630	10,610	35,340	29,310	19,500	21,040	15,120	12,700	9,590	8,400	10,780	9,590
21....	11,460	10,440	35,340	28,440	19,720	21,040	15,500	13,600	9,930	7,890	11,120	10,440
22....	11,290	10,270	36,000	29,020	19,290	21,040	15,120	12,880	10,100	8,570	11,120	9,930
23....	11,630	10,270	36,700	28,440	18,870	20,380	15,310	12,340	9,930	7,550	10,270	10,270
24....	11,460	10,270	37,050	27,860	18,240	20,380	15,310	12,160	9,080	1,100	11,290	10,610
25....	11,460	10,100	37,050	27,570	18,660	19,940	15,500	11,980	9,250	7,720	10,100	11,120
26....	11,630	10,100	36,700	29,020	18,870	20,160	15,690	12,340	9,930	8,570	10,100	11,290
27....	11,630	10,100	37,400	27,280	18,870	19,500	15,690	11,980	9,420	9,250	10,950	11,290
28....	11,460	10,100	37,050	26,700	19,940	19,080	15,120	11,800	9,250	8,060	10,440	11,290
29....	11,630	......	36,350	26,700	21,940	18,870	14,930	11,980	8,740	8,570	10,780	11,460
30....	11,460	......	36,000	27,570	21,040	19,080	14,740	11,800	8,910	9,760	10,780	11,290
31....	11,460	......	37,050	......	21,700	......	14,740	11,460	......	9,760	......	11,290
Mean	**12,295**	**10,877**	**28,700**	**31,282**	**22,212**	**20,474**	**16,338**	**13,315**	**10,206**	**8,657**	**10,777**	**10,405**



Discharge of Richelieu River at Chambly, P. Q., 1902; Outlet of Lake Champlain.

Mean Monthly Run-off of Lake Champlain Drainage Basin at Chambly, P. Q.

[Drainage area, 7,750 square miles.]

IN SECOND-FEET.

	1899.	1900.	1901.	1902.
January	10,630	10,900	11,920	12,295
February	9,618	14,510	9,888	10,877
March	13,322	16,046	10,338	28,700
April	21,678	22,242	30,618	31,282
May	24,595	18,040	28,433	22,212
June	13,903	18,786	20,939	20,474
July	9,622	12,014	13,236	16,338
August	6,877	9,300	10,057	13,315
September	5,174	7,178	7,604	10.206
October	4,531	6,593	6,377	8,657
November	8,950	8,037	6,082	10,777
December	11,432	13,327	10,463	10,405

SECOND-FEET PER SQUARE MILE.

	1899.	1900.	1901.	1902.
January	1.37	1.41	1.53	1.59
February	1.25	1.87	1.28	1.40
March	1.63	2.06	1.33	3.70
April	2.80	2.86	3.95	4.04
May	3.17	2.32	3.66	2.87
June	1.79	2.42	2.70	2.64
July	1.25	1.54	1.32	2.11
August	.89	1.20	1.70	1.72
September	.67	.92	.98	1.32
October	.58	.85	.82	1.12
November	1.15	1.04	.78	1.39
December	1.47	1.72	1.35	1 34

INCHES ON DRAINAGE AREA.

	1899.	1900.	1901.	1902.
January	1.58	1.62	1.76	1.83
February	1.30	1.94	1.33	1.42
March	1.87	2 37	1.53	4.27
April	3.14	3.20	4.42	4.51
May	3.65	2.67	4 21	3.31
June	2.00	2.72	3.02	2.95
July	1.44	1.77	1.52	2.43
August	1.02	1.38	1.96	1.98
September	.75	1.03	1.10	1.47
October	.67	.98	.94	1.29
November	1.29	1.16	.87	1.55
December	1.69	1.98	1,55	1.54

Mean Monthly Run-off of Lake Champlain at Chambly, P. Q., in Second-feet.

[Drainage area, 7,750 square miles.]

YEAR.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Discharge for mean stage.
1875....	5,800	5,900	8,700	19,200	21,500	15,900	11,700	9,500	8,200	9,300	12,300	11,300	11,400
1876....	14,400	13,900	16,100	22,700	30,400	20,700	13,900	9,400	6,600	6,000	5,700	5,000	13,206
1877....	4,900	5,200	8,300	19,100	17,200	11,700	10,900	10,100	8,600	8,100	10,900	12,300	10,500
1878.....	10,400	8,700	12,000	19,300	21,200	13,800	10,100	13,100	12,700	8,600	9,300	17,800	13,000
1879....	14,800	12,700	13,800	19,400	27,000	16,600	12,000	8,900	6,800	5,600	6,100	11,000	12,600
1880....	11,300	14,000	15,900	17,100	15,800	11,400	8,500	6,300	4,400	3,800	9,100	8,300	10,400
1881....	6,900	8,200	13,900	15,500	20,300	14,500	10,100	8,000	6,500	5,400	6,900	8,500	10,300
1882.....	12,100	11,500	16,800	15,600	14,700	17,200	13,800	9,700	7,600	7,200	5,500	4,400	11,200
1883...	4,000	5,000	6,800	17,800	21,800	17,700	13,500	9,700	6,300	4,700	4,700	4,900	9,500
1884.....	5,300	8,700	14,900	25,300	23,400	16,100	10,300	8,900	5,500	5,000	5,700	8,300	11,000
1885....	11,400	11,200	9,900	19,600	24,900	15,300	11,600	9,600	9,700	6,000	16,800	16,700	13,700
1886.	17,000	16,000	15,400	22,900	19,200	13,900	10,300	8,100	6,200	6,200	8,400	13,100	12,800
1887...	10,700	15,000	13,100	23,600	29,000	19,500	13,400	9,900	7,400	5,300	5,000	9,700	13,000
1888..	10,600	10,900	12,900	23,900	30,200	19,700	12,900	9,200	9,900	11,700	15,200	16,200	15,000
1889....	19,300	16,200	14,300	20,200	19,600	17,500	15,300	12,900	9,600	11,400	12,000	14,900	15,100
1890....	13,900	16,000	18,800	20,800	25,500	26,200	14,000	9,700	14,200	13,800	14,200	13,300	16,200
1891....	12,700	16,000	23,400	28,600	23,100	14,200	9,900	8,200	7,300	5,400	5,000	7,200	12,900
1892....	13,400	12,700	11,300	20,000	17,300	19,100	23,900	8,700	15,300	10,400	11,000	11,000	15,100
1893....	8,400	7,900	9,700	16,200	21,700	15,800	9,800	8,000	11,000	8,500	6,600	6,700	10,800
1894....	9,900	10,100	16,200	17,300	14,900	12,800	9,800	6,900	5,800	5,200	6,900	7,100	10,100
1895....	7,800	7,400	7,600	17,600	21,300	14,200	9,400	7,600	7,200	5,400	6,700	12,500	10,200
1896.....	14,800	11,800	18,000	30,500	24,900	14,100	10,300	7,900	6,100	6,500	9,100	9,700	10,100
1897.....	8,300	7,900	10,600	21,600	24,800	21,900	19,300	18,400	12,300	8,500	9,800	15,400	14,500
1898....	14,400	14,900	22,900	24,500	18,600	13,800	9,800	7,400	6,500	8,700	10,300	9,600	13,200
Mean.	10,937	11,158	13,804	20,762	22,012	16,275	12,271	9,837	8,416	7,387	8,883	10,662	12,325

Mean Monthly Run-off of Lake Champlain at Chambly, P. Q.

In Second-feet per Square Mile.

[Drainage area, 7,750 square miles.]

YEAR.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Run-off mean stage.
1875 ...	.75	.76	1.12	2.48	2.77	2.05	1.51	1.23	1.06	1.20	1.59	1.46	1.47
1876 ...	1.86	1.79	2.08	2.93	3.92	2.67	1.79	1.21	.98	.77	.74	.64	1.70
1877 ...	.63	.67	1.07	2.46	2.22	1.51	1.41	1.30	1.11	1.04	1.41	1.59	1.35
1878 ...	1.34	1.12	1.55	2.49	2.73	1.78	1.30	1.69	1.64	1.11	1.20	2.30	1.68
1879 ...	1.91	1.64	1.78	2.50	3.48	2.14	1.55	1.15	.88	.72	.79	1.42	1.63
1880 ...	1.46	1.81	2.05	2.21	2.04	1.47	1.10	.81	.57	.49	1.17	1.07	1.34
1881 ..	.89	1.06	1.79	2.00	2.62	1.87	1.30	1.03	.84	.70	.89	1.10	1.33
1882 ...	1.56	1.48	2.17	2.01	1.90	2.22	1.78	1.25	.98	.93	.71	.57	1.44
1883 ...	.52	.64	.88	2.30	2.81	2.28	1.74	1.25	.81	.61	.61	.63	1.23
1884 ...	.68	1.12	1.92	3.26	3.02	2.08	1.33	1.15	.71	.64	.74	1.07	1.42
1885 ...	1.47	1.44	1.28	2.53	3.21	1.97	1.50	1.24	1.25	.77	2.17	2.15	1.77
1886 ...	2.19	2.06	1.99	2.95	2.48	1.79	1.33	1.04	.80	.80	1.08	1.69	1.65
1887 ...	1.38	1.95	1.69	3.04	3.74	2.52	1.73	1.28	.95	.68	.64	1.25	1.68
1888 ...	1.37	1.41	1.66	3.08	3.90	2.54	1.66	1.19	1.28	1.51	1.96	2.09	1.93
1889 ...	2.49	2.08	1.84	2.61	2.53	2.26	1.97	1.66	1.24	1.47	1.55	1.92	1.95
1890 ...	1.79	2.06	2.43	2.68	3.29	2.99	1.81	1.25	1.83	1.78	1.83	1.72	2.09
1891 ..	1.64	2.06	3.01	3.69	2.98	1.83	1.28	1.06	.94	.70	.70	.64	1.66
1892 ...	1.73	1.64	1.46	2.58	2.23	2.46	3.08	2.41	1.97	1.34	1.34	1.42	1.95
1893 ...	1.08	1.02	1.25	2.09	2.80	2.04	1.26	1.03	1.42	1.10	.85	.86	1.39
1894 ...	1.28	1.30	2.09	2.23	1.92	1.65	1.26	.89	.68	.67	.89	.92	1.30
1895 ...	1.01	.95	.98	2.27	2.75	1.83	1.21	.98	.93	.70	.86	1.61	1.32
1896 ...	1.91	1.52	2.32	3.93	3.21	1.82	1.33	1.02	.79	.84	1.17	1.25	1.30
1897 ...	1.07	1.02	1.37	2.79	3.20	2.83	2.49	2.37	1.59	1.10	1.26	1.99	1.87
1898 ...	1.86	1.92	2.95	3.16	2.40	1.78	1.26	.95	.84	1.12	1.33	1.24	1.70
Mean.	1.41	1.44	1.78	2.68	2.84	2.10	1.59	1.28	1.08	.95	1.15	1.38	1.59

Mean Monthly Run-off of Lake Champlain at Chambly, P. Q.

In inches on drainage area.

[Drainage area, 7,750 square miles.]

YEAR.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1875	.86	.79	1.29	2.78	3.19	2.30	1.74	1.41	1.10	1.29	1.78	1.68
1876	2.14	1.93	2.39	3.28	4.61	2.99	2.06	1.30	1.16	.89	.83	.74
1877	.72	.70	1.23	2.76	2.55	1.69	1.62	1.49	1.24	1.20	1.58	1.83
1878	1.64	1.16	1.79	2.79	3.14	1.99	1.40	1.94	1.64	1.28	1.34	2.64
1879	2.20	1.71	2.05	2.90	4.00	2.40	1.78	1.22	.96	.83	.88	1.08
1880	1.08	1.95	2.36	2.48	2.35	1.65	1.26	.93	.64	.56	1.31	1.23
1881	1.02	1.10	2.06	2.24	3.01	2.09	1.49	1.18	.94	.81	1.00	1.26
1882	1.79	1.54	2.60	2.25	2.19	2.40	2.05	1.44	1.10	1.07	.80	.66
1883	.60	.67	1.01	2.68	3.23	2.55	2.09	1.44	.91	.70	.68	.72
1884	.78	1.21	2.21	3.66	3.47	2.33	1.63	1.32	.80	.74	.83	1.23
1885	1.69	1.50	1.47	2.83	3.69	2.21	1.72	1.43	1.40	.89	2.43	2.47
1886	2.52	2.14	2.29	3.30	2.85	2.06	1.53	1.20	.90	.92	1.21	1.94
1887	1.59	2.01	1.94	2.40	4.30	2.82	1.89	1.47	1.06	.78	.72	1.44
1888	1.68	1.62	1.91	3.46	4.40	2.84	1.91	1.37	1.43	1.74	2.20	2.40
1889	2.86	2.16	2.12	2.92	2.91	2.53	2.27	1.01	1.39	1.69	1.74	2.21
1890	2.08	2.14	2.79	3.00	3.78	3.35	2.08	1.44	2.05	2.05	2.05	1.98
1891	1.89	2.14	3.50	4.12	3.42	2.05	1.47	1.22	1.05	.81	.78	.74
1892	1.99	1.77	1.68	2.89	2.56	2.76	3.64	2.77	2.21	1.64	1.50	1.63
1893	1.24	1.06	1.44	2.34	3.22	2.28	1.44	1.18	1.70	1.26	.95	.99
1894	1.47	1.35	2.39	2.60	2.21	1.85	1.44	1.02	.76	.77	1.00	1.06
1895	1.16	.99	1.13	2.54	3.16	2.05	1.39	1.13	1.04	.81	.96	1.85
1896	2.20	1.64	2.67	4.40	3.69	2.04	1.52	1.17	.88	.97	1.31	1.44
1897	1.23	1.06	1.58	3.12	3.68	3.17	2.86	2.73	1.78	1.26	1.41	2.29
1898	2.14	2.00	2.39	3.54	2.76	1.99	1.45	1.09	.94	1.29	1.49	1.43
Mean	1.62	1.50	2.06	3.00	3.27	2.35	1.83	1.47	1.21	1.09	1.29	1.59

MOHAWK RIVER GAUGINGS.

Despite its importance as a source of power and as an avenue of commerce, very little was known as to the water-yielding capacity of Mohawk River, prior to the investigations of the United States Board of Engineers on Deep Waterways. The results of gaugings of the discharge of the stream over dams at Ridge Mills, Little Falls, Rocky Rift, Rexford Flats, and Dunsbach Ferry, are given below. Gauging records have also been maintained at a current meter station near Schenectady, and for the determination of the discharge by the slope formula at a number of points. At present there are available simultaneous records for the high water period of 1901 on the lower Mohawk, obtained by three distinct methods; the weir formula, the current meter, and the slope formula.

The regimen of the Mohawk River during the navigation season is undoubtedly modified to a large extent by the influence of the Erie Canal, by which the river is paralleled from Rome to Cohoes, a distance of 110 miles. The water supply of the Erie Canal, east of the summit level at Rome is, with a single exception, derived from Mohawk River and its tributaries. At Rome, water enters the watershed which has been brought from adjacent drainage areas feeding the western end of the summit level. In addition, water from Black River watershed is brought in through Black River Canal.

New York State Dams and Canal Feeders in Mohawk Valley.

STREAM.	Location.
Mohawk River........................	Delta, six miles above Rome, Oneida county, N. Y.
Mohawk River........................	Rome, Oneida county, N. Y.
Oriskany Creek........................	Oriskany, Oneida county,. N. Y.
Mohawk River........................	Little Falls, Herkimer county, N. Y.
Mohawk River	Five Mile or Rocky Rift Dam, Herkimer county, N. Y.
Schoharie Creek........................	Fort Hunter, Montgomery county, N. Y.
Mohawk River........................	Rexford Flats, Saratoga county, N. Y.

A large diversion from the watersheds of these feeders is in some measure counterbalanced by return water to the main stream channel from seepage through canal and feeder banks and flow over waste-weirs.

The complex character of the run-off of the Upper Mohawk River is shown by the following current meter measurements which were made on August 18, 1901, at a time when no canal boats were passing, so that the level of water in each case remained statical during the measurements.

Flow from Mohawk River into Delta feeder..	48.8 second-feet
Flow in Mohawk River at bridge, one mile below feeder	145.2 second-feet
Total flow of Mohawk River at Delta....	194.0 second-feet
Flow in Black River Canal below Delta.....	110.1 second-feet
Diversion from Mohawk as above...........	48.8 second-feet
Diversion into Mohawk Valley through Black River Canal above Delta.......	61.3 second-feet

This does not take into consideration diversion or return waters from Lansingkill which parallels Black River Canal above Delta.

August 31, 1900, the diversion to Erie Canal at Rome feeder was found by current meter measurement to be 150 second-feet. The flow in the stream channel below the dam on the same date was 38 second-feet. Total flow at Rome 188 second-feet. Similar measurements August 18, 1901, showed the diversion to the canal at Rome feeder to be 146 second-feet, the estimated waste over the State dam was 35 second-feet, the total flow at Rome being 181 second-feet.

Measurements of the flow in Foresport feeder of Black River Canal were made in connection with the Barge Canal Survey in 1900.[a]

The column in the following table, showing flow in canal south of feeder, represents the inflow from Black River watershed to Mohawk River watershed on the dates named.

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[a] See State Engineer Bond's "Report on Barge Canal, 1901," p. 919, in report of "Engineer for Water Supply."

DATE.	Observed discharge of feeder, second-feet.	Flow in canal south of feeder, second-feet.	Observed flow over waste-weir, second-feet.	Observed flow in canal north of feeder, second-feet.
1900.				
August 31	254.35	197.37	0.00	61.72
September 24	310.57	242.18	2.10	70.15
November 7	323.06	254.23	0.00	68.83
December 1	253.23	181.20	3.00	69.03

The gauging records at Rexford Flats and at Little Falls indicate that the yield of the watershed in second-feet per square mile, and frequently, also, the actual flow in second-feet, is considerably less during the navigation season at the former than at the latter station. The drainage area above Rexford Flats is 3,385 square miles or 2.6 times that at Little Falls, which is 1,306 square miles. The diminished water-yielding capacity of the lower Mohawk basin may be attributed in part to the low water of Schoharie Creek. The drainage area of Schoharie Creek is 947 square miles. Weir measurements at Schoharie Falls show that the flow sometimes falls below 50 second-feet. During practically the entire summer no water flows over the crest of the State dam at Fort Hunter. The major portion of the flow is diverted to the Erie Canal feeder and the remainder leaks through the dam. During the summer of 1900, from June to October, inclusive, the direct inflow to the Mohawk from this tributary did not, with the exception of a few days, exceed 45 second-feet or 0.05 second-feet per square mile.

MOHAWK RIVER AT RIDGE MILLS, ONEIDA COUNTY, N. Y.

Mohawk River rises in Lewis County and flows southerly from Oneida County to Rome where it turns to the east and finally empties into Hudson River at Cohoes. It is shown through the greater portion of its length on the Oneida, Oriskany, Utica, Little Falls, Canajoharie, Fonda, Amsterdam, Schenectady, and Cohoes topographic sheets of the United States Geological Survey.

The gauging station at Ridge Mills was located at the dam Cohocs, where there is a descent of 105 feet over Hudson River shale; extensive water power development being carried out through the construction of a long headrace from which the water is drawn off into lateral canals, utilizing the total fall in five different levels. From Cohoes to Little Falls, the stream valley is broad, with moderate side slopes and the course of the stream usually widening. A barrier of rock crosses the valley at Little Falls, where a gorge has been formed with sides 400 feet high, in passing through which the stream descends 42 feet. Above Little Falls, to a point near Rome, the stream is sluggish and tortuous, winding through a flat valley or flood-plain which is overflowed during high water.

The gauging station at Ridge Mills was located at the dam of the Rome city water-works, three miles above Rome. The dam is of rough timber, with plank facing, having a slightly irregular crest, 122.7 feet in length; which is divided into several sections, each assumed to be level to facilitate discharge computations. During the year 1900, the calculated discharge of the turbines has been made to depend on current meter measurements instead of on the observed wheel gate openings as formerly. The pump-house, adjacent to the dam, contains two 60-inch Helmer turbines. The discharge through these is sensibly proportional to the rate at which the water-work pumps, which they drive, are run. A straight line diagram has been prepared, using the following data, from which the flow through the turbines has been taken.

DATE.	Speed of pumps. revolutions per minute.	Measured flow in tail race, second-feet.
May 29, 1900	15	122
August 23, 1900	12	95

Mean Monthly Run-off of Mohawk River at Ridge Mills, Oneida County, N. Y.

[Drainage area, 153 square miles.]

MONTH.	SECOND-FEET.			SECOND-FEET PER SQUARE MILE.			INCHES ON DRAINAGE AREA.		
	1898.	1899.	1900.	1898.	1899.	1900.	1898.	1899.	1900.
January	......	377	160	......	2.46	1.04	......	2.83	1.20
February	......	244	581	......	1.59	3.80	......	1.65	3.95
March	......	467	336	......	3.05	2.10	......	3.15	2.52
April	......	997	1,062	......	6.52	6.94	......	7.27	7.74
May	......	320	126	......	2.09	0.82	......	2.41	0.95
June	......	281	180	......	1.84	1.17	......	2.05	1.30
July	......	310	160	......	2.02	1.04	......	2.33	1.20
August	......	226	140	......	1.48	0.92	......	1.70	1.06
September	......	81	198	......	0.53	1.30	......	0.59	1.45
October	369	278	212	2.41	1.81	1.39	2.78	2.08	1.60
November	401	291	971	2.62	1.90	......	2.92	2.12	......
December	261	532	......	1.40	3.47	......	1.61	4.00	......
Year	......	......	......	......	......	......	......	32.18	......

Mean Daily Flow in Second-feet of Mohawk River at Ridge Mills, Oneida County, N. Y.

[Drainage area, 153 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	*c* Oct.	*c* Nov.	*c* Dec.
1898.												
1										154	269	123
2										149	249	144
3										133	215	133
4										127	199	133
5										143	215	169
6										249	249	184
7										199	369	144
8										173	259	169
9										159	249	169
10										149	1,134	154
11										143	2,134	184
12										149	697	184
13										154	515	121
14										259	439	135
15										889	371	159
16										349	259	159
17										319	315	154
18										215	294	169
19										199	294	144
20										249	304	159
21										215	279	242
22										999	369	609
23										859	697	974
24										794	409	639
25										519	294	419
26										609	215	344
27										1,251	191	319
28										574	199	159
29										409	134	219
30										339	104	324
31										314	.....	644
Mean										369	401	261

c Revised.

Mean Daily Flow in Second-feet of Mohawk River at Ridge Mills, Oneida County, N. Y.
(Concluded).
[Drainage area, 153 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.
1899.	*c*	*c*	*c*	*c*	*c*						*	*
1	316	214	351	364	321	339	262	218	.....	93	515	225
2	243	214	394	319	319	319	252	233	.....	203	515	695
3	296	214	366	254	239	279	232	248	.....	233	345	395
4	298	214	301	311	204	259	249	131	.....	253	295	345
5	2,373	199	1,176	344	176	214	202	146	.....	200	365	295
6	896	164	1,074	391	151	232	127	131	.....	310	295	295
7	409	123	735	439	102	232	262	126	.....	290	265	275
8	316	166	414	1,264	94	262	322	121	.....	260	295	235
9	299	126	346	1,034	129	259	669	125	85	290	295	235
10	219	129	219	686	138	279	499	129	85	310	245	235
11	164	129	254	799	344	249	379	139	85	340	315	315
12	157	129	1,174	1,364	414	282	359	169	95	260	295	3,625
13	157	129	1,211	1,492	296	282	339	265	89	310	265	1,155
14	153	173	701	2,181	361	302	339	245	85	260	265	510
15	911	265	364	1,741	214	402	319	275	99	310	265	455
16	725	258	321	1,841	161	399	399	295	115	240	265	365
17	459	184	239	1,364	389	359	319	220	135	220	295	295
18	324	126	219	1,654	361	339	399	230	112	290	295	295
19	223	166	274	2,226	549	282	382	245	85	290	265	1,075
20	199	151	581	2,034	614	279	339	245	79	290	245	1,495
21	193	160	464	1,404	436	262	302	265	79	240	245	1,095
22	208	494	364	1,264	319	259	382	295	56	260	265	315
23	214	697	389	1,139	274	299	299	272	56	260	265	315
24	261	389	436	959	239	259	282	289	56	310	265	345
25	338	346	416	766	219	259	275	262	60	540	295	215
26	318	296	344	614	204	259	262	269	69	220	265	285
27	244	336	274	549	189	249	289	309	69	310	265	285
28	223	451	241	439	386	249	165	309	53	340	265	285
29	208	.....	581	354	1,136	249	133	278	53	360	205	285
30	170	.....	436	319	546	229	178	315	79	260	205	75
31	170	.....	436	.....	344	.....	178	200	.....	260	.....	75
Mean	377	244	467	997	320	281	310	226	81	278	291	532
1900.	*a*				*b*	*b*	*b*	*b*	*b*	*b*	*b*	
1	270	200	784	810	130	168	125	104	155	175	395	.....
2	270	132	815	1,080	130	216	115	120	115	185	365	.....
3	270	100	750	1,245	130	285	105	120	109	165	340	.....
4	290	180	630	1,135	130	230	105	92	105	113	340	.....
5	310	100	280	1,065	130	180	160	90	112	115	460	.....
6	310	248	224	1,245	130	168	158	104	112	113	1,970	.....
7	340	128	354	2,205	130	215	175	84	112	115	965	.....
8	1,115	125	359	1,845	130	180	170	84	104	111	835	.....
9	475	1,628	320	1,070	130	230	112	107	85	113	705	.....
10	530	1,128	300	740	130	230	110	100	100	127	725	.....
11	475	854	280	680	130	185	120	88	100	118	725	.....
12	420	738	219	930	125	180	150	154	107	118	640	.....
13	415	3,162	254	930	100	180	137	365	92	109	620	.....
14	305	1,928	254	835	100	215	130	458	95	102	645	.....
15	305	1,058	219	900	100	165	100	364	115	395	580	.....
16	265	618	164	1,485	105	155	100	88	115	395	580	.....
17	265	578	149	1,685	210	158	160	84	215	395	620	.....
18	345	284	159	3,375	210	180	140	80	325	109	640	.....
19	365	202	169	1,805	147	165	163	84	118	90	1,550	.....
20	1,365	188	544	935	147	170	165	92	179	90	1,760	.....
21	1,535	198	590	930	130	170	250	98	625	95	1,480	.....
22	875	288	594	1,235	130	165	185	124	615	95	965	.....
23	655	803	594	930	112	185	125	97	415	95	965	.....
24	285	714	370	675	105	205	132	84	435	895	735	.....
25	365	268	164	555	105	140	515	165	395	415	1,665	.....
26	480	172	160	365	105	145	270	165	205	395	3,990	.....
27	285	202	164	365	105	123	198	120	175	410	*d*	.....
28	265	132	160	315	105	180	175	185	127	395	.....	.....
29	270	.....	164	275	110	130	180	125	185	345	.....	.....
30	270	.....	116	225	105	124	107	124	205	95	.....	.....
31	270	.....	112	.....	105	.....	117	179	.....	95	.....	.....
Mean	460	581	336	1,062	126	180	160	140	198	212	971	.....

*** Record doubtful.**
***a* Record doubtful; owing to ice on crest of dam.**
***b* Record doubtful; flash-boards changed frequently.**
***c* Revised.**
***d* Dam and gauge injured in flood.**

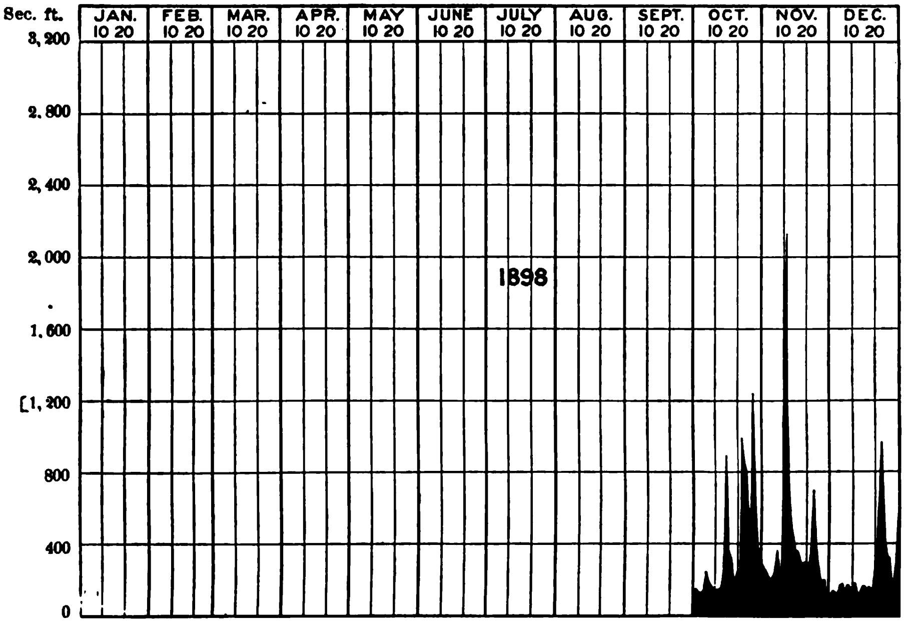
A measurement of the leakage of the dam was made in the stream channel below, August 23, 1900, when no water was flowing over the crest. The leakage was found to be 20 second-feet, and an allowance for this amount has been made in estimating the daily flow. A rough current meter measurement of the discharge at the bridge crossing the pond above the dam, April 22, 1900, showed the inflow to the pond to be 1,385 second-feet. August 31, 1900, the total flow of the stream at Riverside Park, one mile below the dam, was found to be 188 second-feet.

The gauging record at Ridge Mills does not include any allowance for diversion to Black River Canal at Delta feeder, four miles upstream, nor for return water from seepage and waste weirs. Water for the municipal supply of Rome is taken from Mohawk River at Ridge Mills, the amount of diversion averaging 2,500,000 gallons per day, equivalent to a continuous flow of 4 second-feet. The dam was injured by the flood of November 26, 1900, and the record discontinued. On November 26, 1900, the maximum calculated discharge of 4,940 second-feet occurred, corresponding to a flow of 32.3 second feet per square mile of the tributary drainage area of 153 square miles. March 12, 1898, a discharge rate of 5,266 second-feet was obtained. This is equivalent to 34.5 second-feet per square mile. The highest previous freshet reported occurred in the spring of 1898, the calculated discharge being 7,080 second-feet or 46.4 second-feet per square mile. During extreme high water, some discharge takes place through overflow channels under the highway at the left of the dam. This has been included in the above estimates.

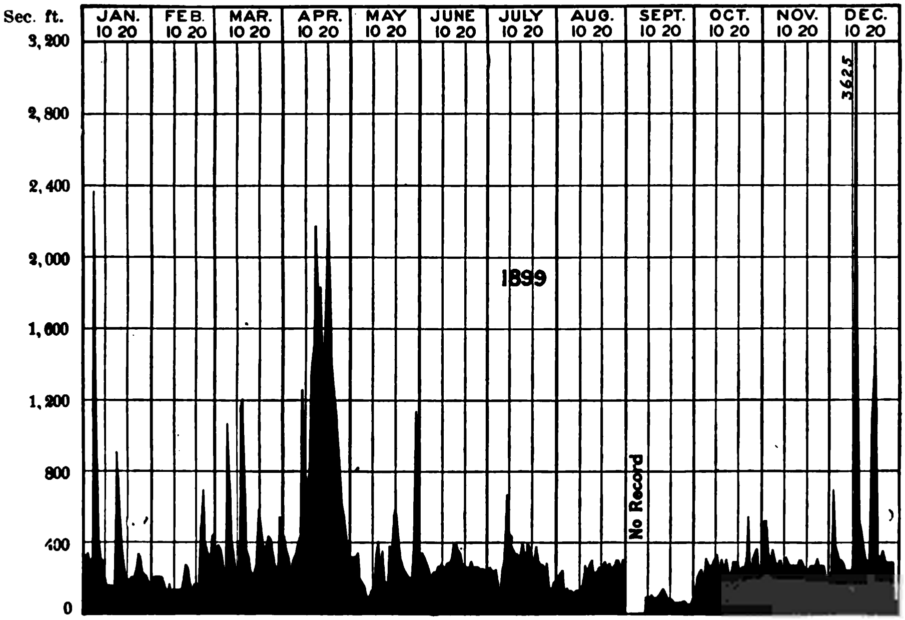
ORISKANY CREEK AT ORISKANY, ONEIDA COUNTY, N. Y.

This stream rises in Oneida County, N. Y., and flows in a northerly direction, emptying into the Mohawk River.

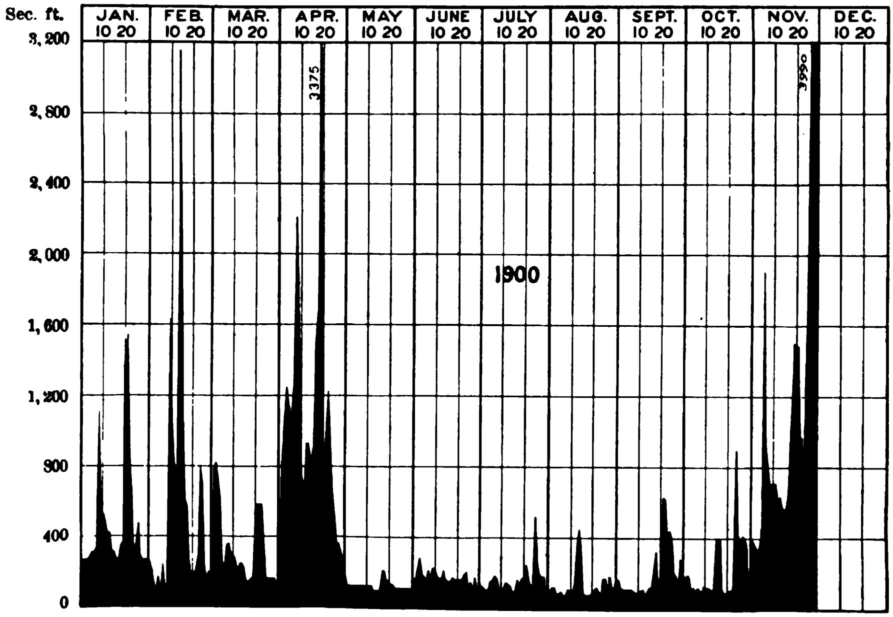
The location of this station, as well as that of a second station which was maintained for a time at Coleman on this



Discharge of Mohawk River at Ridge Mills, Oneida County, N. Y., 1898.



Discharge of Mohawk River at Ridge Mills, Oneida County, N. Y., 1899.



Discharge of Mohawk River at Ridge Mills, Oneida County, N. Y., 1900.

stream are shown on the Oriskany atlas sheet of the United States Geological Survey.[a] The Oriskany station is located at the New York State Dam, which is of timber, having a crest 214 feet in length with a somewhat irregular profile, which, in order to facilitate computation, has been divided into three sections, each assumed to be level; its elevation being taken equal to the average elevation of this portion of the profile. The dam is low, the difference of elevation on the upstream and downstream sides ordinarily being about 4 feet. During extreme high water the dam becomes completely submerged. During the summer, the entire flow, less leakage, is ordinarily diverted to the canal feeder. H. Waterbury & Company's dam, located just below the State dam, backs water above the toe of the latter, so that direct measurements of the leakage of the State dam cannot readily be made.

During the winter and spring the flow of the stream is available for power from the lower dam, but during the season of navigation the inflow to the Mohawk from this tributary amounts to only a few second-feet. The computed flow at the gauging station represents the total outgo from the pond above the State dam, and includes water diverted from Chenango River through the channel of Oriskany Creek to feed the Erie Canal.

A record was kept of the height of water in the pond above the dam, and also in the feeder-channel below the head-gates. The observed difference, or head on the feeder-gates, together with the area of the gate openings, have been used in the formula for discharge through submerged orifices, to determine the flow. A screen rack in the forebay, just above the feeder-gates, often becomes clogged with drift, causing a loss of head of several inches. In order that the correct head on the feeder-gates might be obtained, a gauge was placed in the fore-bay, between the screen rack and feeder-gates, at the beginning of the navigation season of 1900.

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[a] See Water Supply and Irrigation Paper, U. S. Geol. Survey, No. 35, p. 47. The record kept at Coleman is described in Report U. S. Board of Engineers on Deep WaterWays, 1900, pt. II, pp. 594-595.

During the dry season the gateways leading to the feeder are wide open, and the water flows through unobstructed, as in an open channel, so that the formula or orifices cannot be applied.

In this connection, the difficulties encountered in gauging the flow in canal feeders are worth comment. Broadly speaking, the amount of water required for the supply of canals is proportional to lockage and evaporation jointly, with perhaps a constant factor added for seepage losses. As a matter of fact, however, the rate of flow in the feeder often fluctuates within wide limits several times a day. Gates are usually placed in both the inlet and outlet ends of the feeder-channel. The stage or height of the water in the feeder is influenced by that of the water in the canal itself, as well as in the supply pond above, while the velocity of flow may be varied by changes in the gate opening at either end. Isolated discharge measurements are of value in a general way, but it may be said that nothing short of a continuous record, both of the stage of the water in the feeder and of its velocity of flow will serve to determine the actual diversion from day to day.

Mean Monthly Run-off of Oriskany Creek at Oriskany, Oneida County, N. Y.

[Drainage area, 144 square miles.]

MONTH.	SECOND-FEET.			SECOND-FEET PER SQUARE MILE.			INCHES ON DRAINAGE AREA.		
	1898.	1899.	1900.	1898.	1899.	1900.	1898.	1899.	1900.
January	......	295	199	......	2.04	1.38	......	2.85	1.59
February	......	291	378	......	2.02	2.62	......	2.10	2.72
March	......	342	386	......	2.37	2.67	......	2.73	3.07
April	......	466	488	......	3.23	3.38	......	3.60	3.77
May	......	119	136	......	0.83	0.94	......	0.95	1.08
June	......	99	95	......	0.69	0.66	......	0.77	0.73
July	......	180	100	......	1.25	0.69	......	1.44	0.79
August	......	186	103	......	1.29	0.71	......	1.48	0.81
September	......	126	73	......	0.87	0.51	......	0.97	0.57
October	325	91	85	2.25	0.63	0.59	2.59	0.72	0.68
November	327	360	255	2.27	2.49	1.78	2.53	2.77	1.99
December	327	89	272	2.27	0.62	1.90	2.61	0.71	2.19

Mean Daily Flow in Second-feet of Oriskany Creek at Oriskany, Oneida County, N. Y.

[Drainage area, 144 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	....	....	....	....	....	....	....	....	....	....	329	266
2	....	....	....	....	....	....	....	....	....	....	298	259
3	....	....	....	....	....	....	....	....	....	....	274	428
4	....	....	....	....	....	....	....	....	....	....	276	413
5	....	....	....	....	....	....	....	....	....	....	266	457
6	....	....	....	....	....	....	....	....	....	....	269	445
7	....	....	....	....	....	....	....	....	....	....	267	445
8	....	....	....	....	....	....	....	....	....	....	236	462
9	....	....	....	....	....	....	....	....	....	....	284	393
10	....	....	....	....	....	....	....	....	....	....	370	388
11	....	....	....	....	....	....	....	....	....	....	740	425
12	....	....	....	....	....	....	....	....	....	....	370	460
13	....	....	....	....	....	....	....	....	....	....	365	346
14	....	....	....	....	....	....	....	....	....	....	333	160
15	....	....	....	....	....	....	....	....	....	....	352	150
16	....	....	....	....	....	....	....	....	....	338	311	300
17	....	....	....	....	....	....	....	....	....	248	304	280
18	....	....	....	....	....	....	....	....	....	212	304	160
19	....	....	....	....	....	....	....	....	....	231	310	220
20	....	....	....	....	....	....	....	....	....	266	392	195
21	....	....	....	....	....	....	....	....	....	248	359	300
22	....	....	....	....	....	....	....	....	....	328	263	380
23	....	....	....	....	....	....	....	....	....	350	300	825
24	....	....	....	....	....	....	....	....	....	316	324	410
25	....	....	....	....	....	....	....	....	....	230	278	355
26	....	....	....	....	....	....	....	....	....	330	253	210
27	....	....	....	....	....	....	....	....	....	564	502	150
28	....	....	....	....	....	....	....	....	....	457	335	100
29	....	....	....	....	....	....	....	....	....	403	309	235
30	....	....	....	....	....	....	....	....	....	339	254	235
31	....	....	....	....	....	....	....	....	....	336	....	285
Mean	....	....	....	....	....	....	....	....	....	325	327	327
1899.												
1	180	157	495	180	238	90	....	206	83	180	320	90
2	180	167	355	170	144	80	....	206	87	138	175	103
3	195	150	425	160	139	80	....	167	73	108	115	73
4	220	177	460	260	139	80	....	126	10	99	138	108
5	220	167	910	390	129	80	....	126	75	119	144	80
6	250	217	650	425	124	80	138	177	108	132	346	107
7	285	230	410	525	122	80	184	177	101	122	374	99
8	220	243	300	1,270	122	80	170	195	133	138	429	40
9	260	277	240	770	124	80	104	195	176	95	364	30
10	220	277	215	600	124	80	100	195	180	58	394	10
11	255	343	175	490	28	89	117	195	159	106	634	45
12	255	343	645	1,220	28	94	124	195	95	97	534	340
13	410	364	490	1,440	25	89	124	195	78	92	564	380
14	505	343	340	1,160	25	94	124	195	87	26	584	80
15	550	364	280	910	30	104	124	206	85	72	564	65
16	505	337	255	625	105	101	208	206	89	45	484	80
17	380	343	200	370	122	94	208	206	115	106	524	40
18	315	337	230	340	134	113	197	206	123	58	584	65
19	255	304	355	290	139	113	183	206	119	71	202	250
20	260	297	370	260	120	113	183	206	138	48	53	130
21	290	390	330	230	140	113	270	206	161	82	124	110
22	270	410	285	130	160	113	270	206	129	73	154	50
23	290	104	355	50	140	118	270	206	162	85	174	50
24	290	303	280	50	115	118	196	206	102	88	214	70
25	260	287	285	50	115	118	196	206	112	70	174	50
26	285	297	240	416	159	118	196	194	181	70	438	40
27	305	367	220	406	144	118	196	184	222	54	318	80
28	340	244	215	120	139	113	196	184	216	158	318	35
29	305	....	205	335	139	113	196	184	185	72	582	30
30	290	....	190	325	129	113	196	98	206	55	789	65
31	300	....	190	....	134	....	196	98	....	115	....	70
Mean	295	291	342	466	119	99	180	186	126	91	360	89

Mean Daily Flow in Second-feet of Oriskany Creek, at Oriskany, Oneida County, N. Y.—
(Concluded.)

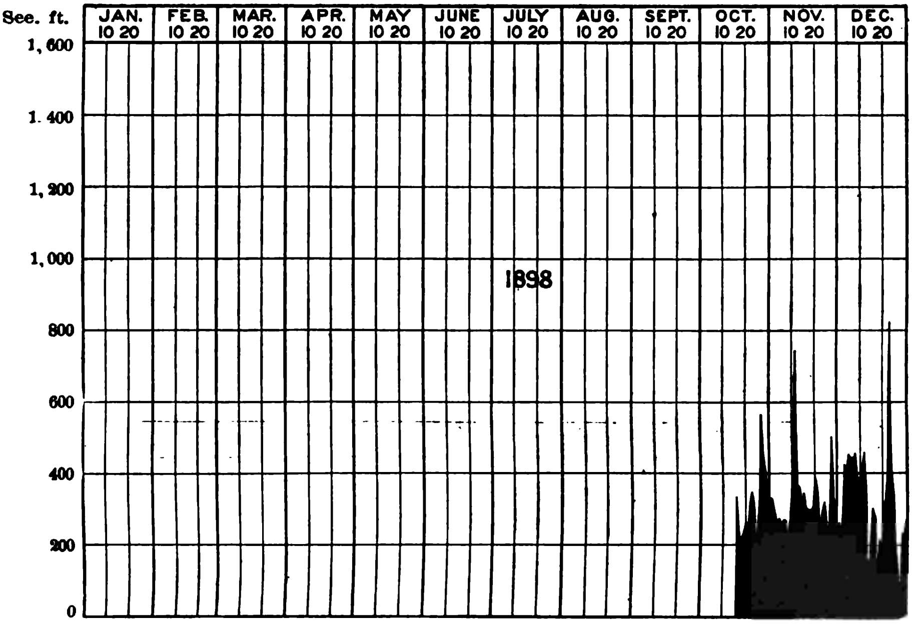
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	64	139	254	1,318	228	95	110	100	82	70	186	250
2	133	212	786	1,391	192	95	110	100	74	70	191	205
3	81	326	876	1,046	163	95	110	100	76	70	136	185
4	96	286	776	546	163	95	110	100	84	70	117	175
5	41	416	736	426	144	95	110	100	66	70	122	607
6	76	302	398	916	183	95	140	100	81	70	73	427
7	54	218	756	896	161	95	88	100	85	70	95	330
8	101	302	454	506	163	97	73	100	85	175	101	285
9	54	1,871	366	308	136	95	104	100	61	66	105	205
10	114	596	302	206	133	95	101	100	73	63	35	177
11	56	416	218	194	150	95	107	100	73	75	185	203
12	96	139	163	286	70	95	105	100	61	75	151	147
13	51	3,116	157	316	105	95	105	100	70	75	106	292
14	68	454	157	254	94	95	105	124	70	75	113	142
15	81	248	139	212	105	95	105	107	70	78	136	112
16	133	139	133	206	118	95	105	103	70	84	96	157
17	145	114	127	470	144	95	105	100	70	81	113	202
18	114	76	76	1,090	171	95	105	100	70	78	114	217
19	546	60	170	427	156	95	107	100	70	80	81	217
20	1,376	81	696	315	148	95	105	100	70	80	127	337
21	576	127	496	212	161	95	107	100	70	75	127	277
22	721	170	294	877	115	95	124	100	70	75	78	242
23	176	236	326	379	113	95	105	100	70	77	158	272
24	91	96	386	260	113	95	105	100	70	83	161	1,172
25	481	91	254	239	113	95	114	100	70	75	430	427
26	156	56	236	235	113	95	110	100	70	75	2,592	242
27	51	170	183	201	113	95	112	110	70	103	857	217
28	106	133	227	283	113	97	108	132	75	100	312	172
29	91	.....	286	282	113	95	33	111	85	100	242	172
30	114	.....	686	272	113	95	32	100	85	100	297	192
31	156	.....	846	.....	113	95	30	100	.....	191	.....	177
Mean	199	378	386	488	136	95	100	103	73	85	255	272

Current Meter Discharge Measurements of Oriskany Feeder.

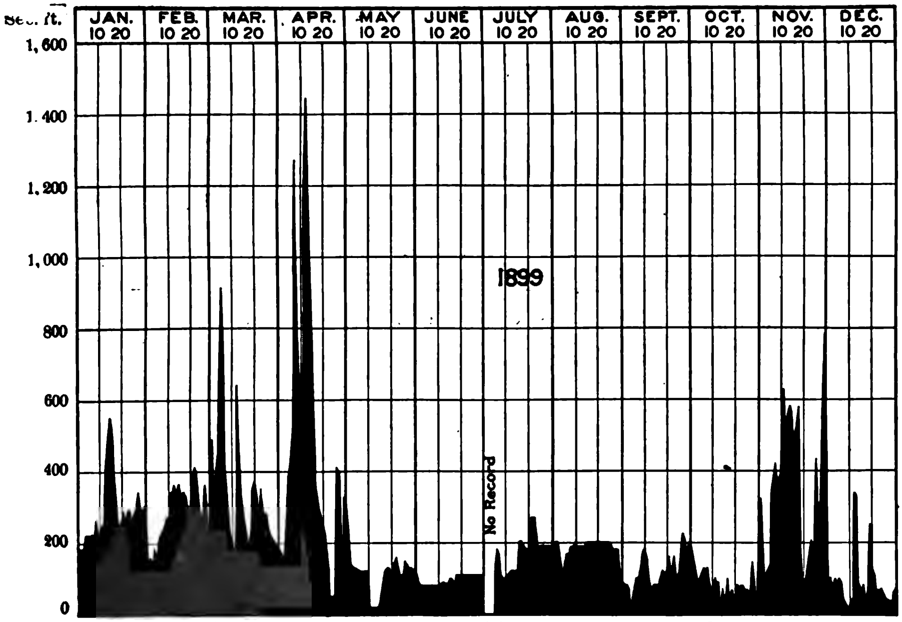
DATE.	Discharge, second-feet.	Hydrographer.
October 13 1898	77.94	W. D. Lockwood.
October 15, 1898	49.55	W. D. Lockwood.
October 15, 1898 *a*	118.89	W. D. Lockwood.
April 28, 1900	167.95	R. E. Horton.
May 29, 1900	103.20	R. E. Horton.
August 7, 1900	100.70	E. C. Murphy.
August 8, 1900	62.20	E. C. Murphy.
August 10, 1900	84.00	E. C. Murphy.
August 11, 1900	100.00	E. C. Murphy.
May 1, 1901	87.80	R. E. Horton.
May 1, 1901 *a*	109.60	R. E. Horton.
May 2, 1901	173.00	R. E. Horton.

a Second measurement made after a change in feeder gate openings.

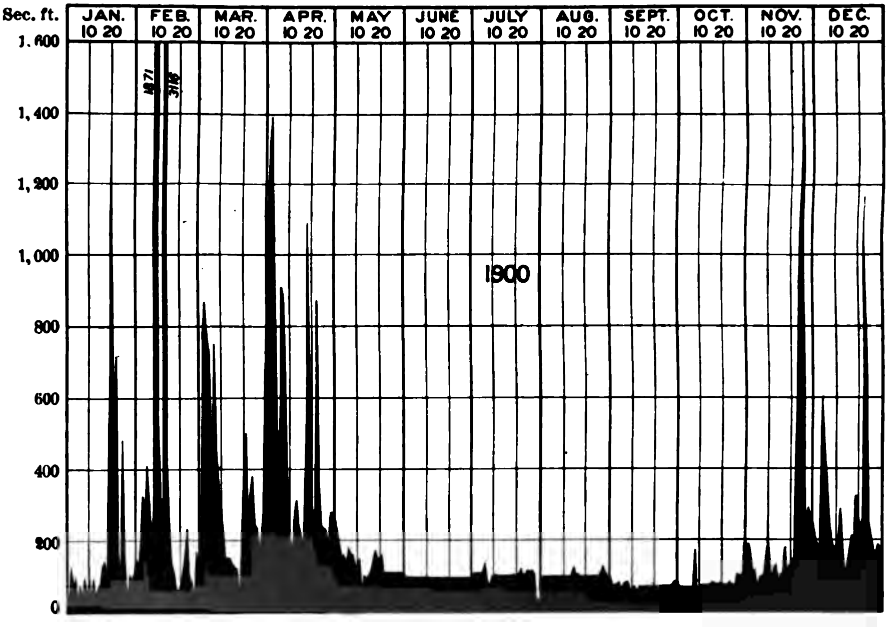
April 30, 1900, the discharge from Oriskany Creek to Mohawk River was measured below H. Waterbury & Company's Mill, Oriskany, and found to be 84 second-feet.



Discharge of Oriskany Creek at Oriskany, Oneida County, N. Y., 1898.



Discharge of Oriskany Creek at Oriskany, Oneida County, N. Y., 1899.



Discharge of Oriskany Creek at Oriskany, Oneida County, N. Y., 1900.

ORISKANY CREEK AT WOOD ROAD BRIDGE, ORISKANY, ONEIDA COUNTY, N. Y.

Owing to difficulty of determining summer flow with precision, the original gauging station at the State Dam in Oriskany was abandoned January 31, 1901.[b] This station was replaced on June 26, 1901, by a current meter gauging station at Wood's Road Bridge one-half mile farther upstream. The location of this station may be seen on the Oriskany sheet of the topographic atlas of the United States Geological Survey. An 8.5-foot standard cypress gauge board, divided to feet and tenths and set in a vertical position, was attached to the upstream side of the right-hand abutment of the bridge, from which readings of the height of the stream are taken twice daily by the gauge reader, Charles H. Smith. The bridge stands squarely across the channel, has vertical masonry abutments and a span of 80 feet. The bench mark is situated on the northwest corner of the upstream side of the bridge seat, on the right-hand abutment.

Elevation of bench mark..................	100.00
Elevation of gauge zero....................	86.34

Owing to cross currents underneath the bridge at times of low water, the current meter measurements are made by wading at a point 300 feet below the bridge. During 1901 the following discharge measurements were made:

DATE.	Gauge height, feet.	Discharge, second-feet.
August 29, 1901	1.58	77.2
August 19, 1901	1.58	73.5
August 27, 1901	1.60	79.3
October 11, 1901	1.71	81.0
June 26, 1901	2.10	196.8

Current meter Discharge Measurements of Oriskany Creek at Wood Road Bridge, 1902

DATE.	Guage height, feet.	Discharge, second-feet.	Hydrographer.
September 9	2.00	275	C. C. Covert.
March 3	5.12	2,125	R. E. Horton.

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[b] See description under "Oriskany Creek at Oriskany."

March 1, 1902, the calculated discharge over the Waterbury Dam was 5,200 second-feet, the gauge reading at Wood Road Bridge being 8.26 feet. This was taken after the ice flow passed downstream.

The calculated maximum discharge of Oriskany Creek during the freshet of December 15-16, 1901, was 7,350 second-feet or 51.4 second-feet per square mile.

A rough measurement of the discharge at Wood Road Bridge May 1, 1900, showed a total flow of 289 second-feet.

The flow of Oriskany Creek at Wood Road Bridge represents the natural run-off of the tributary watershed of 144 square miles modified by pond storage at numerous mills, with the additional flow during summer months due to diversion from storage reservoirs in Chenango River watershed through the summit level of the abandoned Chenango Canal into Oriskany Creek. The relation between the effective watershed during the canal season and during the winter months is shown below:

Drainage Area of Oriskany Creek.

	Square miles.
Natural drainage area above gauging station	143.00
Chenango River area made tributary through Chenango Canal in summer	87.00
Total effective drainage area during navigation season	230.00
Effective drainage area, canals closed	143.00

Storage Reservoirs on Chenango River. [a]

NAME OF RESERVOIR.	Storage depth, feet.	Average surface area, acres.	Impounding capacity, cubic feet.
Eaton Brook	50	254	533,212,000
Hatch Lake	10	134	58,370,400
Bradley Brook	25	134	145,926,000
Kingsley Brook	20	113	98,445,900
Madison Brook	40	235	460,647,000
Leland Pond	8	173	59,287,000

[a] State Engineer Bond's "Report on Barge Canal, 1901," p. 678, in report of "Engineer for Water Supply."

Owing to the maintenance of an equable summer flow through draft from these storage reservoirs, Oriskany Creek forms an excellent water power stream.

Mean Daily Gauge Height of Oriskany Creek at Wood's Road Bridge, Oriskany, Oneida County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	....	....	....	....	....	....	1.8	1.8	2.25	1.8	1.8	3.7
2	....	....	....	....	....	....	1.8	1.8	2.2	1.85	1.7	3.65
3	....	....	....	....	....	....	1.85	1.65	2.1	1.9	1.75	3.5
4	....	....	....	....	....	....	1.75	1.6	1.7	1.8	1.7	3.4
5	....	....	....	....	....	....	1.95	1.55	1.7	1.9	1.7	3.25
6	....	....	....	....	....	....	2.9	1.6	1.65	1.8	1.7	2.7
7	....	....	....	....	....	....	2.3	1.9	1.6	1.75	1.6	2.6
8	....	....	....	....	....	....	2.1	1.9	1.55	1.7	1.75	3.5
9	....	....	....	....	....	....	1.95	1.9	1.55	1.6	1.7	4.25
10	....	....	....	....	....	....	1.85	1.75	1.5	1.7	1.7	5.55
11	....	....	....	....	....	....	1.85	1.7	1.65	1.65	1.9	4.3
12	....	....	....	....	....	....	1.75	1.8	1.8	1.6	2.4	2.45
13	....	....	....	....	....	....	1.85	1.6	1.8	1.85	2.75	2.6
14	....	....	....	....	....	....	1.75	1.5	1.8	1.8	2.4	3.9
15	....	....	....	....	....	....	1.75	1.6	1.9	1.9	2.1	7.35
16	....	....	....	....	....	....	1.7	1.85	1.75	1.9	1.95	4.25
17	....	....	....	....	....	....	1.95	1.7	1.8	1.9	2.2	3.4
18	....	....	....	....	....	....	1.95	1.7	1.7	2.0	2.4	3.0
19	....	....	....	....	....	....	1.7	1.65	1.7	2.0	2.25	2.65
20	....	....	....	....	....	....	1.45	1.6	1.7	2.0	2.05	2.65
21	....	....	....	....	....	....	1.6	1.8	1.65	1.95	2.25	2.8
22	....	....	....	....	....	....	1.65	1.8	1.7	1.85	2.3	2.9
23	....	....	....	....	....	....	1.7	1.65	1.7	1.8	2.45	2.8
24	....	....	....	....	....	....	1.7	1.6	1.65	1.9	2.45	3.05
25	....	....	....	....	....	2.2	1.6	1.6	1.6	1.7	2.7	3.7
26	....	....	....	....	....	2.15	1.7	1.65	1.6	1.75	2.7	3.5
27	....	....	....	....	....	2.0	....	1.65	1.75	1.8	2.65	3.35
28	....	....	....	....	....	1.95	1.6	1.35	1.55	1.8	2.6	3.3
29	....	....	....	....	....	2.0	1.8	1.7	1.75	1.75	2.95	4.35
30	....	....	....	....	....	1.8	1.85	1.6	1.95	1.7	3.65	4.3
31	....	....	....	....	....	....	1.85	1.5	1.8	1.75	.....	4.0
1902.												
1	3.70	3.30	8.0	2.60	1.85	1.8	2.5	2.5	1.5	2.5	2.5	2.3
2	4.4	3.0	7.0	2.9	1.8	1.6	2.1	2.9	1.95	2.7	2.35	2.15
3	4.7	3.0	6.0	3.1	2.05	2.15	2.7	2.4	2.2	2.05	2.35	2.45
4	4.45	3.5	4.8	2.75	2.4	3.05	3.3	2.3	2.75	1.7	2.35	2.7
5	4.0	3.4	3.45	2.7	1.9	2.5	4.3	2.0	2.15	1.7	2.2	2.3
6	3.9	3.2	2.95	2.6	1.9	2.05	3.6	3.7	1.7	2.2	2.55	2.5
7	3.85	3.05	2.9	2.5	1.9	2.0	3.5	3.1	1.95	2.3	2.3	3.4
8	3.8	3.0	2.7	2.4	1.8	2.4	3.2	3.25	1.65	2.15	2.0	3.75
9	3.6	3.0	2.6	2.55	1.8	3.1	2.9	2.4	1.8	2.0	2.0	4.65
10	3.4	2.8	2.75	3.25	1.75	3.5	3.75	2.05	2.2	1.8	1.9	4.5
11	3.6	2.8	3.0	2.7	1.65	3.1	2.8	2.45	1.9	1.65	2.15	4.6
12	3.15	3.1	6.1	2.45	1.6	2.7	2.4	2.25	1.7	1.65	2.3	4.6
13	2.8	3.1	6.05	2.7	1.6	2.2	2.0	2.0	1.4	1.8	2.35	4.6
14	2.6	3.1	4.9	2.65	1.6	2.25	1.8	2.0	1.4	1.8	2.2	4.5
15	2.6	3.1	3.9	2.4	1.6	2.25	2.7	1.8	1.6	1.65	2.05	4.5
16	2.6	3.1	4.15	2.4	1.2	2.0	2.6	1.6	1.6	1.65	1.95	4.9
17	3.0	3.1	5.8	2.4	1.2	1.9	2.25	1.75	1.6	1.6	2.05	5.7
18	2.7	3.1	4.7	2.3	1.4	1.85	1.90	2.1	1.7	1.6	2.25	5.8
19	2.6	3.1	4.0	2.2	1.5	2.0	2.35	2.5	1.6	2.25	2.1	4.8
20	2.6	3.1	3.05	2.2	1.85	1.9	2.5	2.1	1.4	2.1	1.8	4.4
21	2.8	3.15	3.2	2.2	1.6	2.0	4.0	2.1	1.55	2.2	1.95	4.15
22	3.7	3.2	3.15	2.1	1.4	1.9	3.9	2.5	1.6	1.95	1.8	4.9
23	3.45	3.2	3.2	2.0	1.35	2.0	3.25	2.7	1.5	2.2	1.7	3.95
24	3.2	3.2	3.25	1.9	2.0	2.0	2.8	2.15	1.6	2.15	2.05	3.4
25	3.2	3.4	3.0	1.9	1.9	1.8	2.55	1.9	1.6	1.9	2.2	3.9
26	3.25	3.45	2.8	1.9	2.9	2.1	2.25	1.6	1.9	1.8	2.3	3.8
27	3.65	3.9	2.7	1.9	2.85	2.0	1.9	1.45	1.5	2.0	2.55	3.9
28	3.6	5.0	2.7	1.9	2.75	1.85	2.6	1.85	1.6	5.1	2.8	3.85
29	3.6	.....	3.05	1.9	2.8	1.85	2.7	1.7	1.95	3.5	2.45	4.0
30	3.5	.....	2.9	2.0	3.2	2.25	2.35	1.55	2.2	2.9	2.2	3.95
31	3.4	.....	2.7	.....	2.7	.....	2.3	1.45	.....	2.9	.....	3.8

SAUQUOIT CREEK AT NEW YORK MILLS, ONEIDA COUNTY, N. Y.[a]

This stream rises in Oneida county and flows in a northerly direction, emptying into Mohawk River. It is shown in a part of its course on the Oriskany topographic sheet of the United States Geological Survey. Observations of flow are made at the dam which furnishes power to the upper, or No. 3, mill of the New York Mills.

The dam is of earth with plank facing, having a spillway 105.8 feet in length. The profile of the crest is somewhat irregular, and, in order to facilitate computation, has been divided into nine parts. Each part is assumed to have a horizontal crest line.

In the mill are two 27-inch Hercules turbines, which are run night and day a large part of the year.

During the summer but little water flows over the dam, the entire volume being used to drive the water wheels in the adjoining cotton mills.

The leakage of the dam was measured by current meter May 31, 1900, and found to be 5.6 second-feet.

This station was abandoned October 1, 1900.

Mean Monthly Run-off of Sauquoit Creek at New York Mills, Oneida County, N. Y.

[Drainage area, 52 square miles.]

MONTH.	SECOND-FEET.			SECOND-FEET PER SQUARE MILE.			INCHES ON DRAINAGE AREA.		
	1898.	1899.	1900.	1898.	1899.	1900.	1898.	1899.	1900.
January	......	58	72	......	1.12	1.40	......	1.29	1.61
February	......	58	140	......	1.12	2.83	......	1.16	2.94
March	......	111	81	......	2.15	1.65	......	2.48	1.90
April	......	127	138	......	2.47	2.68	......	2.75	2.99
May	......	38	49	......	0.74	0.95	......	0.85	1.09
June	......	23	32	......	0.45	0.62	......	0.50	0.69
July	......	20	32	......	0.39	0.62	......	0.45	0.71
August	......	16	22	......	0.31	0.43	......	0.36	0.49
September	27	14	15	0.52	0.26	0.29	0.58	0.29	0.32
October	56	17	......	1.08	0.33	......	1.24	0.38	......
November	57	26	......	1.10	0.50	......	1.23	0.56	......
December	57	29	......	1.10	0.56	......	1.26	0.64	......

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[a] See Water Supply and Irrigation Paper, U. S. Geol. Survey, No. 35, p. 48.

SAUQUOIT CREEK AT YORKVILLE, ONEIDA COUNTY, N. Y.

A continuous gauging record of Sauquoit Creek has not been maintained during 1901 and 1902. Current meter measurements have been made as shown below, at the New York Central and Hudson River Railroad bridge, which crosses the stream on Mohawk River flats one-half mile above the mouth of Sauquoit Creek.

Mean Daily Flow in Second-feet of Sauquoit Creek at New York Mills, Oneida County, N. Y. [*No.* 3.]

[Drainage area, 51.5 square miles.]

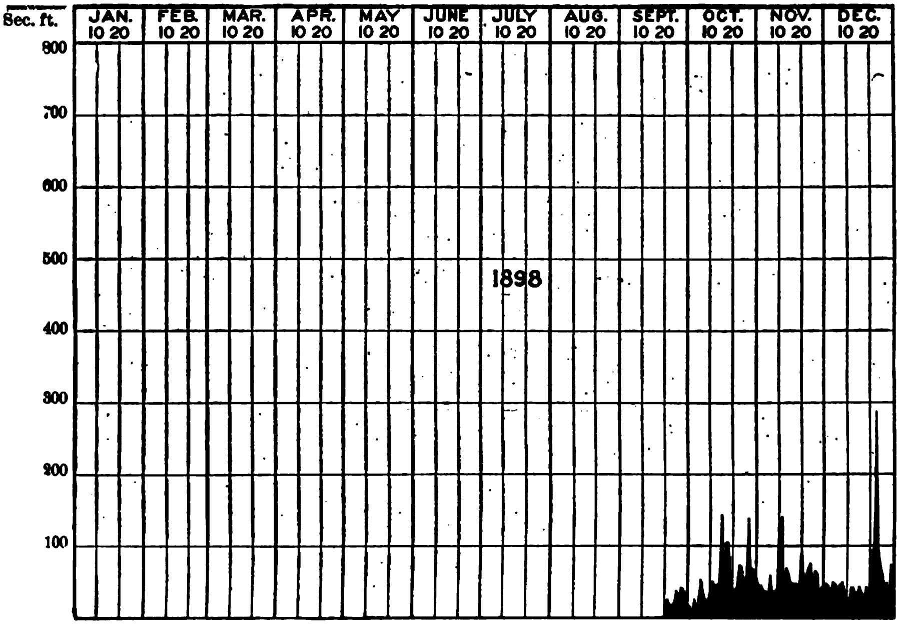
DAY	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	42	44
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	*7	43	49
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	27	38	34
4	.....	.....	.....	.....	.....	.....	.....	.....	*	18	36	*50
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	31	32	46
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	54	*59	42
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	38	44
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	36	49
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	*23	38	42
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	132	28
11	.....	.....	.....	.....	.....	.....	.....	.....	*	52	140	*22
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	46	58	42
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	46	*69	42
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	46	62	36
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	144	52	37
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	*80	49	42
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	105	49	34
18	.....	.....	.....	.....	.....	.....	.....	.....	*	105	49	*30
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	43	42
20	.....	.....	.....	.....	.....	.....	.....	.....	18	36	*95	38
21	.....	.....	.....	.....	.....	.....	.....	.....	26	38	46	76
22	.....	.....	.....	.....	.....	.....	.....	.....	18	42	61	104
23	.....	.....	.....	.....	.....	.....	.....	.....	16	*73	60	288
24	.....	.....	.....	.....	.....	.....	.....	.....	22	71	76	99
25	.....	.....	.....	.....	.....	.....	.....	.....	*37	48	42	*76
26	.....	.....	.....	.....	.....	.....	.....	.....	30	59	66	62
27	.....	.....	.....	.....	.....	.....	.....	.....	40	140	*62	46
28	.....	.....	.....	.....	.....	.....	.....	.....	40	74	36	44
29	.....	.....	.....	.....	.....	.....	.....	.....	30	68	43	38
30	.....	.....	.....	.....	.....	.....	.....	.....	21	*66	42	74
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	57	.....	52
Mean	.....	.....	.....	.....	.....	.....	.....	.....	27	56	57	57

*Sundays.

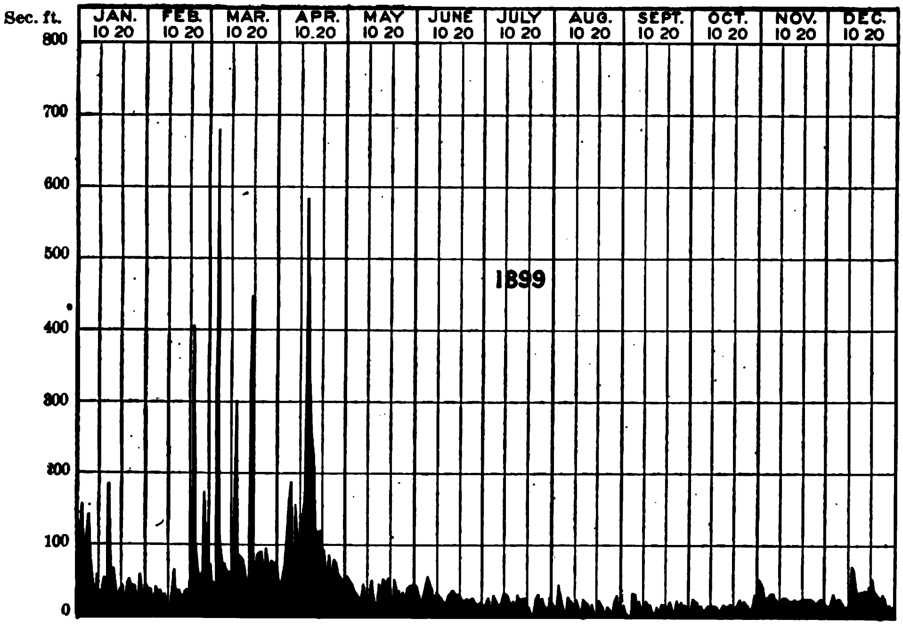
Mean Daily Flow in Second-feet of Saquoit Creek at New York Mills, Oneida County, N. Y.
[*No.* 3]—(Concluded).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1.	72	42	71	45	56	42	12	17	18	*	53	19
2.	158	36	48	*40	50	34	*	11	5	29	42	13
3.	58	38	48	57	48	18	27	43	*	24	21	*23
4.	111	18	42	73	36	*30	10	30	.....	21	26	32
5.	140	*40	*680	104	33	42	30	12	33	15	*29	22
6.	74	36	109	165	28	56	27	*	32	16	32	26
7.	50	36	72	188	*26	48	18	26	6	8	32	26
8.	*13	26	73	47	47	39	16	25	21	*13	24	19
9.	58	30	62	*156	35	23	*25	22	12	18	24	12
10.	38	21	60	100	26	34	31	.....	*	18	19	*14
11.	30	6	85	144	30	*13	30	25	22	18	29	16
12	36	*65	*300	160	50	28	27	14	19	18	*29	72
13.	54	35	87	585	25	20	19	*	19	16	29	64
14.	41	35	85	350	*9	19	22	25	8	7	24	38
15.	*185	29	82	253	47	30	13	22	5	*13	24	32
16.	57	29	71	*228	36	34	*30	18	15	18	21	35
17.	68	33	50	122	52	38	23	5	*	15	24	*35
18.	48	37	43	118	47	*7	27	18	19	16	21	38
19.	30	*13	*447	119	51	30	27	5	19	18	*24	32
20.	36	48	80	98	52	30	19	*	13	14	26	42
21.	42	58	65	90	*12	23	11	22	14	12	26	54
22.	*13	409	87	53	52	21	3	19	21	*18	26	35
23.	48	100	90	*86	35	25	*	16	10	24	25	32
24.	52	62	90	59	36	23	27	5	*	18	21	*30
25.	44	50	55	80	29	*23	30	15	22	22	18	25
26.	44	*65	*95	76	33	26	22	10	15	19	*22	32
27.	42	173	69	58	20	20	27	*	22	15	24	28
28.	14	62	79	54	*40	19	11	22	13	7	24	16
29.	*59	.....	76	43	42	20	14	30	18	*19	21	19
30.	36	.....	71	*50	42	21	*	18	10	32	21	13
31.	30	.....	78	.....	43	.....	27	5	.....	26	.....	*14
Mean	58	58	111	127	38	23	20	16	14	17	26	29
1900.												
1.	86	87	69	*207	81	42	*5	23	27	.....	.....	.....
2.	46	77	81	337	81	20	38	23	*5	.....	.....	.....
3.	46	97	33	267	81	*29	38	34	5	.....	.....	.....
4.	40	*45	*21	135	87	42	5	10	23	.....	.....	.....
5.	40	69	81	135	30	42	38	*5	23	.....	.....	.....
6.	17	72	74	91	*43	35	86	30	17	.....	.....	.....
7.	*25	67	89	269	87	29	34	23	20	.....	.....	.....
8.	50	147	89	*207	81	40	*9	23	26	.....	.....	.....
9.	36	495	86	103	81	24	65	20	*5	.....	.....	.....
10.	42	65	38	87	74	*17	65	17	23	.....	.....	.....
11.	40	*67	*17	87	77	42	28	15	37	.....	.....	.....
12.	46	172	74	113	41	46	32	*5	5	.....	.....	.....
13.	18	1,413	74	95	*55	41	32	23	5	.....	.....	.....
14.	*9	130	68	87	87	25	22	20	10	.....	.....	.....
15.	50	92	68	*135	65	32	*5	17	17	.....	.....	.....
16.	43	68	63	85	26	24	42	20	*5	.....	.....	.....
17.	50	37	42	207	35	*5	35	20	13	.....	.....	.....
18.	50	*55	*13	297	35	29	35	37	17	.....	.....	.....
19.	306	74	68	170	24	41	28	*5	17	.....	.....	.....
20.	272	68	371	95	*29	38	32	30	17	.....	.....	.....
21.	*117	68	95	193	35	38	33	18	17	.....	.....	.....
22.	92	379	93	*295	35	25	*5	20	13	.....	.....	.....
23.	97	392	93	95	35	27	38	17	*9	.....	.....	.....
24.	115	34	55	103	35	*5	38	17	13	.....	.....	.....
25.	95	*13	*67	91	35	32	48	18	17	.....	.....	.....
26.	65	80	89	87	14	38	42	*5	13	.....	.....	.....
27.	22	47	68	87	*33	25	32	30	17	.....	.....	.....
28.	*68	74	87	49	28	32	22	37	13	.....	.....	.....
29.	83	.....	86	*55	22	57	*5	35	13	.....	.....	.....
30.	91	.....	199	91	5	33	38	35	*5	.....	.....	.....
31.	63	.....	165	.....	35	.....	35	37	.....	.....	.....	.....
Mean	72	146	84	138	49	32	32	22	15	.....	.....	.. ..

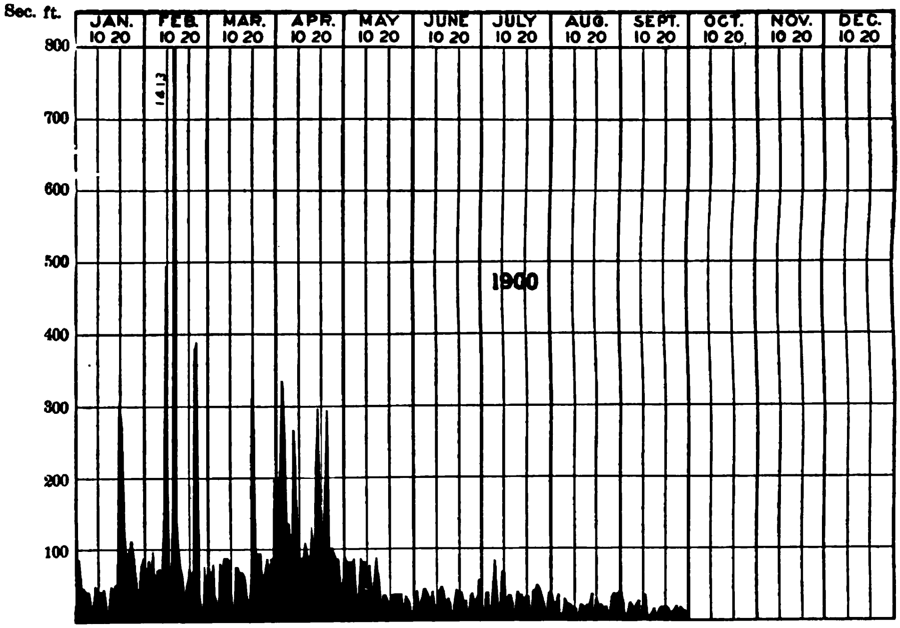
*Sundays.



Discharge of Sauquoit Creek at New York Mills (No. 3), Oneida County, N. Y., 1898.



Discharge of Sauquoit Creek at New York Mills (No. 3), Oneida County, N. Y., 1899.



Discharge of Sauquoit Creek at New York Mills (No. 3), Oneida County, N. Y., 1900.

Principal Developed Water Powers on Sauquoit Creek, Oneida County, N. Y., in 1901.

Number of dam from mouth of stream.	LOCATION.	Name of mill or owner.	Manufacture.	Rated horse power of water wheels.	Working Head or Fall in Feet.			Number of Employees.			Remarks.
					Greatest.	Least.	Average.	Men.	Women.	Total.	
1	New York Mills	The New York Mills No. 4	Hosiery, yarns and corduroys	266	30	27	28				
1	New York Mills	The New York Mills No. 2	Hosiery, yarns and corduroys	500	30	28	29				
2	New York Mills	The New York Mills No. 3	Cotton cloth	300	18.5	17	18				
3	Capron	Utica Cotton Company	Cotton fabrics and yarns	100	21	21	21	160	90	250	
*4	New Hartford	Divine Brothers	Buffing and polishing wheels	25			6	20	30	50	
*4	New Hartford	New Hartford Knitting Mill	Not operated				9		none.	none.	
*4	New Hartford	New Hartford Mills	Custom milling				12	3	none.	3	
*4	New Hartford	New Hartford Cotton Mfg. Company	Unbleached cotton cloth	120	20	20	20	60	80	140	
5	Washington Mills	Utica Tool Company	Agricultural hand tools	150	14	12	13	90	none	90	One wheel not run.
6	Washington Mills	Washington Mills	Textile mill abandoned	100			11	none.	none.	none	Dam failed spring 1901
7	Willowvale	Utica Willowvale Bleaching Company	Bleaching and finishing	none.			9.5	135	135	270	Dam for water supply only.
8	Willowvale	J. C. Dewhurst	Carriage shop				10	none.	none.	none.	Not operated; first water privilege.
8	Willowvale	J. H. Rehm	Saw, grist and cider mill	80			10	2	none.	2	Uses overflow or waste-water at dam.
9	Chadwicks	Chadwicks Mills Cotton Company	Yarns, sheeting and corduroy		22	22	22	65	60	125	Not in operation.
10	Sauquoit	Lewis Knitting Company	Cotton underwear	65	23	18	20	25	75	100	
11	Sauquoit	Sauquoit Valley Mills	Flour, feed and saw mill	101	15	15	15	4	none.	4	
12	Sauquoit	Polk's Knife Factory	Farriers' knives	87	20	20	20	2	none.	2	
13	Sauquoit	Adolph Seigel, Lower Mill	Paper mill	none.	20	20	20	none.	none.	none.	Mill not operated.
14	Sauquoit	Adolph Seigel, Upper Mill	Pulp mill	none.	24	20	22	15	none.	15	Dam destroyed; runs by steam.
15	Clayville	Alfred King	Foundry	50	15	15	15				
16	Clayville	Empire Woolen Company	Worsted and cashmeres	80	26	24	25	175	120	55	
17	Clayville	Empire Woolen Company	Dam now used for storage only	none			15	none.	none.	none.	
18	Clayville	First National Bank, Utica	No power in use	none.			15	none.	none.	none.	
19	Clayville	Babbitt's Wire Works	Line wire	114	30	30	30				

* Water used in four levels; total fall in power canal, 48 feet.

Meter-measurements of flow of Sauquoit Creek at N. Y. C. & H. R. R. bridge, one-half mile above mouth of creek.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
August 27, 1901	16.6	12.7	J. D. Luther.
August 29, 1901	16.2	24.2	J. D. Luther.

The gauge height given is distance down to water surface from a bench mark on the top of the center brace of the upstream girder. The location of the bridge may be seen on the Oriskany sheet of the topographic atlas of the United States Geological Survey. The bridge is located below the lowest dam and water power on the stream. It is two miles below the gauging station formerly maintained at the upper New York Mills.[a] Owing to its rapid fall and favorable location near Utica, the available water powers of Sauquoit Creek have been developed to the fullest possible extent.

MOHAWK RIVER AT UTICA, ONEIDA COUNTY, N. Y.

A gauging station was established at the Genesee Street bridge across Mohawk River at Utica, March 21, 1901.

The bridge consists of two spans of 83 and 72 feet respectively. A vertical gauge board in two parts has been secured to the downstream side of the central pier.

From Rome to Little Falls, a distance of 36 miles, Mohawk River flows through an alluvial valley, the stream channel being flanked by flood-plains one-half mile or more in width. This flat valley is flooded to a depth of several feet during freshets. The intensity of floods at Little Falls is ameliorated in some degree by this extensive natural storage reservoir. During the navigation season the regimen of the stream above Utica is highly artificial. At Rome nearly the entire flow above the State dam is often diverted into Erie Canal, as is also the flow of Oriskany Creek, the principal tributary between Rome and Utica. There is also a certain amount of return water from waste-weirs, some of which is brought through feeders to the canal from the adjacent watersheds of the Black, Chenango and Oneida Rivers. The run-off from the tributary area of 500 square miles above the Utica gauging station, is much less during the canal season than it would be from an equal area of the watershed without diversion.

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[a] See page 128

Current meter measurements of the flow at Utica Station have been made as shown in the following table. The flood measurement of March 27, 1901, does not include a small amount of water which passed over Deerfield road, crossing the neck of the river bend, in the bow on which the gauging station is situated.

Current Meter Discharge Measurements of Mohawk River at Utica, Oneida County, N. Y.

DATE.	Elevation of water surface, feet.	Discharge, second-feet.
1901.		
August 3	393.85	125
August 2	393.95	161
August 1	394.15	232
October 11	394.32	232
July 31	394.70	405
July 31	394.75	465
May 11	396.18	736
June 5	396.88	987
June 1	396.94	1,107
May 31	397.74	1,293
June 4	399.13	1,583
June 24	401.48	2,573
December 16	404.65	5,817
March 27	406.12	10,888

Current-meter Discharge Measurements of Mohawk River at Utica, Oneida County, N. Y.

DATE.	Elevation water surface.	Discharge second-feet.	Hydrographer.
1902.			
March 4	405.96	11,678	R. E. Horton.
July 1	398.63	2,071	H. R. Beebe.
July 3.	400.43	2,589	H. R. Beebe.
July 7	403.11	4,391	H. R. Beebe.
August 22	395.17	454	C. C. Covert.
December 10	395.97	a681	R. E. Horton.
December 11	396.47	a817	C. C. Covert.

a Measured through 6 inches of ice, at Schuyler St. Bridge, Utica, N. Y.

The elevation of the water surface at Utica during previous severe floods, with the corresponding discharge estimated from a rating table deduced from the current meter measurements, is given below, the elevations having been furnished by Stephen E. Babcock, C. E.

Estimated Flood Discharges of Mohawk River at Utica, Oneida County, N. Y.

DATE.	Elevation.	Estima discha second-f
Mean low water	394.64	
Freshet, November 22, 1900	398.49	1
Freshet, November 27, 1900	403.44	8
High water of 1890	405.66	8
High water, February 26, 1891	407.22	17,
High water, 1892	406.44	12,
High water, 1893	406.37	12,
High water, 1894	405.62	8,
High water, 1895	406.32	11.
High water, 1899	405.52	9.
High water, March 27, 1901	406.19	11.
High water, December 15, 1901	406.75	14.
High water, March 1, 1902	407.14	17,

From observations of slope during the freshet of Novemb 27, 1900, Mr. Babcock calculated the flood discharge of Mohaw River at Utica to be 12,643 second-feet.[a]

An aggregate of about five second-feet is diverted for wat supply from Ballou, Starch Factory and Reel's Creeks, thre small tributaries entering Mohawk River just below the Utic gauging station. The location of the gauging station may b seen on the Utica quadrangle of the topographic atlas sheet o the United States Geological Survey.

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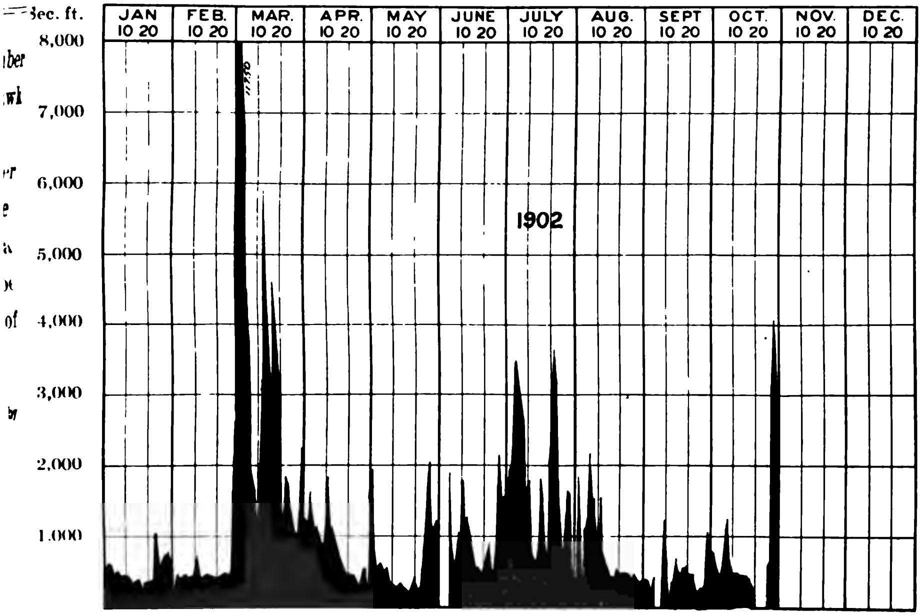
[a] Engineer's report to the Mohawk River Straightening Commission, Utica, N. Y., 1900, b Stephen E. Babcock.



Discharge of Mohawk River at Utica, Oneida County, N. Y., 1902.

Mean Daily Flow in Second-feet of Mohawk River at Utica Oneida County, N. Y.
[Drainage area, 500 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1901.												
1....	......	......	......	......	620	990	365	235	730	350	155	226
2...	......	......	......	......	575	1,155	280	210	540	415	220	395
3....	......	......	......	2,160	620	1,325	265	165	570	410	......	1,095
4....	......	......	......	2,680	410	1,705	......	135	900	340	140	745
5....	......	......	......	3,450	385	905	340	130	450	270	130	485
6....	......	......	......	3,050	320	555	760	135	180	200	105	485
7....	......	......	......	2,300	270	2,160	895	160	......	365	145	415
8...	......	......	......	3,750	190	2,595	895	340	60	220	135	415
9....	......	......	......	3,650	130	......	365	65	60	210	305	515
10....	......	......	......	3,150	75	1,685	315	235	95	160	245	2,000
11..	......	......	......	2,530	785	730	270	470	140	510	245	2,385
12....	......	......	......	2,420	1,890	620	305	340	350	510	345	2,510
13....	......	......	......	1,980	......	315	255	235	505	335	1,985	1,685
14....	......	......	......	1,980	1,005	435	......	160	445	1,295	1,455	1,990
15....	......	......	......	1,785	605	410	245	165	......	730	590	11,400
16....	......	......	......	1,500	485	360	200	80	625	415	540	3,850
17....	......	......	......	1,315	500	......	235	175	515	335	485	5,100
18....	......	......	......	1,215	510	......	340	175	445	570	540	3,140
19....	......	......	......	1,050	......	385	255	160	365	730	555	2,080
20....	......	......	......	1,035	660	565	210	165	260	490	485	1,050
21....	......	......	......	990	550	1,520	......	245	......	420	455	760
22....	......	......	......	1,360	435	2,080	135	180	135	370	425	520
23....	......	......	......	1,915	1,065	2,550	155	145	140	305	455	635
24....	......	......	......	1,720	920	2,510	130	175	120	270	415	650
25....	......	......	......	2,060	520	1,380	125	200	......	140	880	650
26....	......	......	......	2,000	......	580	135	190	85	140	1,020	555
27....	......	......	......	1,700	435	460	135	145	......	140	485	545
28....	......	......	......	760	535	360	105	......	70	165	1,045	515
29....	......	......	......	705	920	365	200	125	70	155	340	530
30....	......	......	......	650	1,340	340	440	......	270	140	255	1,065
31....	......	......	......	......	1,240	......	380	130	......	......	......	930
Mean.	......	......	......	1,932	643	1,076	312	189	325	375	503	1,655
1902.												
1....	536	283	11,750	......	1,972	......	1,618	408	383	589	1,585	870
2....	631	484	11,150	1,264	771	......	1,972	1,900	383	743	743	785
3....	617	420	10,300	1,652	562	......	2,009	......	270	575	743	960
4....	484	420	6,800	1,295	......	......	......	433	270	484	673	2,085
5....	......	445	4,520	1,110	617	1,900	3,542	1,140	445	445	659	1,486
6....	510	445	3,840	1,140	523	743	......	1,295	......	510	645	687
7....	471	420	1,990	1,020	523	510	......	2,200	......	945	1,080	715
8....	471	420	1,810	900	562	673	2,688	1,520	......	1,233	743	900
9....	471	433	1,653	900	370	1,050	1,619	1,520	*a* 35	729	575	813
10....	433	420	1,155	2,085	320	631	1,828	......	1,232	484	458	701
11....	433	701	......	1,864	......	1,775	1,810	715	645	458	589	841
12....	395	420	3,200	1,186	270	1,065	870	1,536	*a* 69	458	645	729
13....	345	420	5,895	1,110	......	1,264	701	757	370	484	1,050	......
14....	358	420	4,700	1,005	320	1,080	645	617	345	471	757	549
15....	408	445	3,542	870	205	......	930	523	715	471	631	617
16....	408	445	3,060	729	295	......	1,810	484	510	458	631	645
17....	283	433	4,640	659	220	549	1,586	......	484	383	562	......
18....	370	433	......	589	208	549	870	471	562	395	562	2,661
19....	370	433	3,025	497	308	......	701	484	562	......	589	2,920
20....	370	433	2,085	458	433	484	2,085	523	562	1,900	701	2,850
21....	395	433	1,295	484	283	......	2,767	484	471	......	603	2,066
22....	420	445	1,390	433	245	......	3,684	484	458	......	645	2,280
23....	1,050	445	1,864	458	245	900	3,200	484	484	......	975	3,390
24....	1,050	471	1,705	......	585	549	1,825	......	220	......	900	......
25....	562	471	1,342	270	......	484	1,005	484	220	......	799	2,520
26....	673	538	1,140	383	1,520	960	813	395	245	562	617	1,486
27....	729	1,828	1,050	536	2,085	2,180	......	471	245	631	......	1,020
28....	729	......	1,020	562	1,035	1,536	1,687	420	320	3,200	2,085	......
29....	785	......	1,342	270	1,110	......	1,653	383	1,080	4,100	1,232	813
30....	673	......	2,240	1,520	1,202	1,569	715	383	743	3,095	855	757
31....	510	......	1,279	......	701	......	433	383	......	1,586	......	799
Mean.	531	496	3,475	902	651	1,023	1,669	774	457	1,016	805	1,368

a Below limit of rating curve.

Mean Monthly Run-off of Mohawk River at Utica, Oneida County, N. Y.
[Drainage area, 500 square miles.]

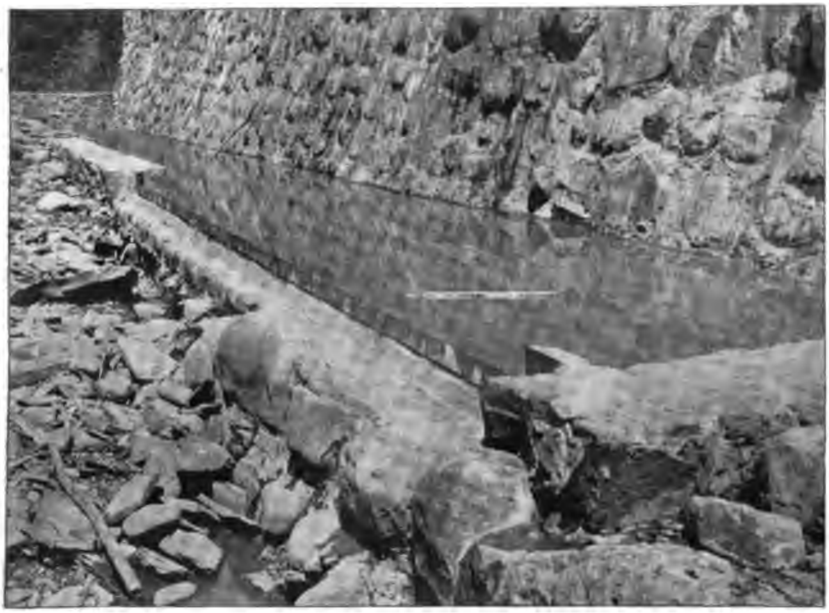
MONTH.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
1901.			
January	....	....	....
February	....	....	....
March	....	....	....
April	1,932	3.86	4.32
May	643	1.29	1.48
June	1,076	2.16	2.42
July	312	0.62	0.71
August	189	0.38	0.43
September	325	0.65	0.73
October	375	0.75	0.86
November	503	1.01	1.13
December	1,655	3.31	3.82

Mean Monthly Run-off of Mohawk River at Utica, Oneida County, N. Y.
[Drainage area, 500 square miles.]

MONTH.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
1902.			
January	531	1.06	1.22
February	496	.99	1.03
March	3,475	6.95	7.99
April	902	1.80	2.01
May	651	1.30	1.50
June	1,023	2.04	2.28
July	1,669	3.33	3.84
August	774	1.54	1.78
September	457	.91	1.01
October	1,016	2.03	2.34
November	805	1.61	1.30
December	1,368	2.74	3.16

REEL'S CREEK NEAR UTICA, ONEIDA COUNTY, N. Y.

Reel's Creek is tributary to the Mohawk River from the north at Utica, N. Y. Its drainage basin is shown on the Utica sheets of the U. S. Geological Survey; the watershed is precipitous. The stream receives numerous lateral tributaries draining deep ravines and entering the main stream at short intervals, in such a manner as to be conducive to the rapid carrying off of surface waters. The watershed is mostly pasture land, some timber and a small percentage of cultivated fields. A deep soil of clay and gravel is underlaid with loose shale There is very little swamp or "spring ground." Tributaries which head in the gravel of the serrated hillsides, as a rule, become dry at times. Others which have shale beds are fed



Gauging Weir on Reel's Creek, near Utica, Oneida County, N. Y., 1902.

by spring of percolating water, which has passed through the glacial drift to the rock horizon.

In 1900, a masonry intake dam was constructed on the stream four miles north of Utica by The Consolidated Water Company of Utica. Beginning January 1, 1901, a record has been kept of the wasteage at this dam as well as the diversion for water supply purposes whenever water has been taken. A record of the precipitation on the watershed has been kept at Deerfield Reservoir, one mile downstream from the intake dam. The records of rainfall and stream flow have been furnished by William S. Bacot, C. E.

The intake dam has a spillway of 119.7 feet long, with a crest six feet in width having a slope downward on the upstream side of 0.75 foot. The water falls into a masonry pool. In order to determine the low-water flow more accurately than could be done by calculation of the discharge over the masonry spillway crest, a standard thin-edged weir was constructed on the overflow wall of the water cushion. The weir has a crest 29.02 feet long with two complete end contractions. The crest is of steel, set perfectly level, and readings of depth are made on a hook gauge set in a stilling box, six feet upstream from the weir.

A calculation of the discharge over the main spillway of the intake dam under low heads was made by running constant volumes of water over both the spillway and weir, corresponding to different depths on the spillway, and the data so obtained has been used in reducing the observations taken before the weir was constructed. During the period from June 1, 1901, to May 1, 1902, the gauge was read, as a rule, only once a week. During the remainder of the record the observations have been taken daily.

There are no dams, ponds or storage reservoirs above the point of gauging, and the stream receives very little surface contamination. The records are of interest in that they show the natural regimen of a small stream of the Northern plateau, as well as the sequence of rainfall and run-off of a torrential watershed. The accompanying diagram shows the total flow of the stream at the intake dam and the depth of precipitation, in inches of rain or melted snow.

The basin formed by the intake dam has a storage capacity of 17,000,000 gallons. It is nearly always filled and exerts very little influence on the rate of discharge of storm waters. The greatest known freshet in the stream occurred August, 1898. Data is not available for the calculation of the discharge. It is known to have greatly exceeded any freshet which has occurred while the record has been kept. It is probable that the record does not show the maximum discharge on March 1st of 1902, as the daily gauge reading was taken before the flood reached its highest stage. The minimum flow since the installation of the gauging weir occurred August 30 to September 1, 1902, inclusive, and shows a discharge of 0.4 second-feet per square mile from the drainage area of 4.5 square miles or 0.089 second-foot per square mile. The drainage area of the stream above its confluence with Mohawk River is 8.4 square miles.

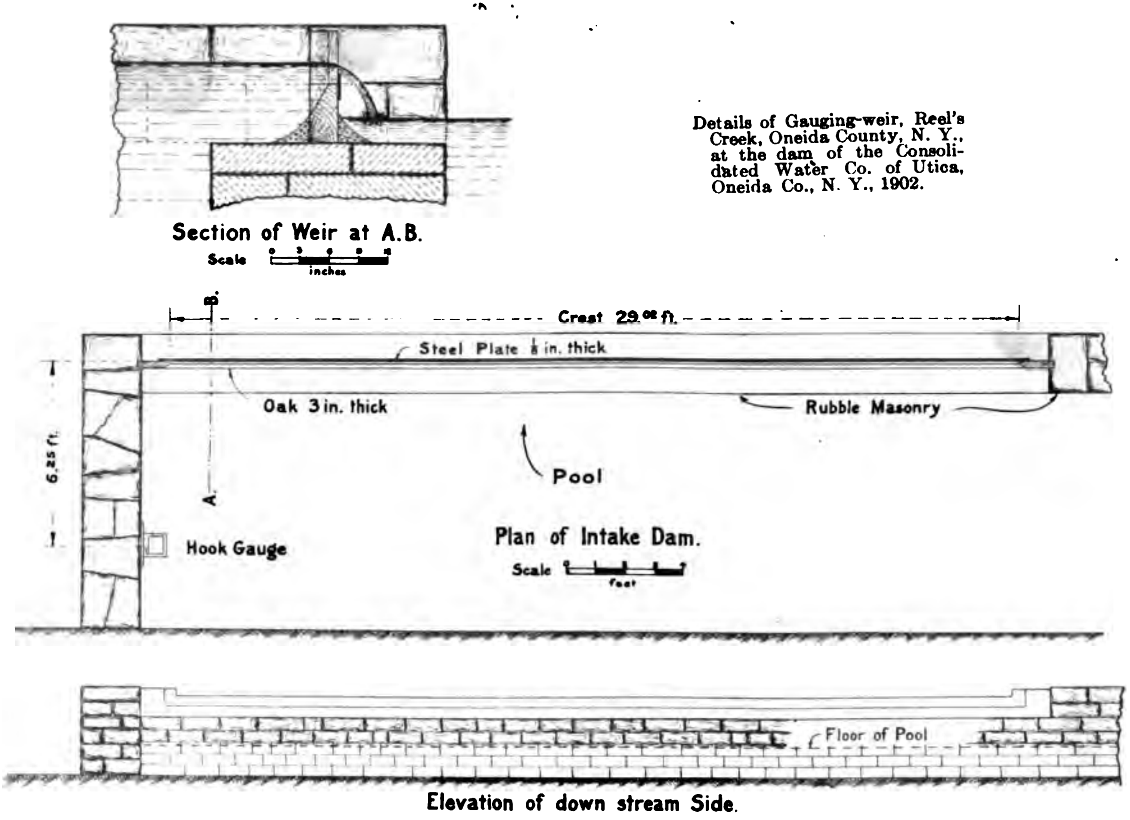
Measurements of the flow of Reel's Creek at a point 200 feet upstream from the intake dam, made during 1902 gave the following results:

DATE.	Time.	Discharge in second-feet.
1902.		
April 26	P. M.	2.4
May 5	P. M.	9.7
May 14	A. M.	1.2

Surface floats were used, and, owing to the low velocity and small volume of discharge, they were run through a short section (35 feet).

In this connection may be given the data relative to certain other small watersheds.

The maximum discharge of Ballou's Creek, which enters Mohawk River at Utica from the south is calculated from the observed depth on the spillway and waste gate of the No. 4 reservoir of the Utica Water Works Company at 181 second-feet



Details of Gauging-weir, Reel's Creek, Oneida County, N. Y., at the dam of the Consolidated Water Co. of Utica, Oneida Co., N. Y., 1902.

Section of Weir at A.B.

Plan of Intake Dam.

Elevation of down stream Side.

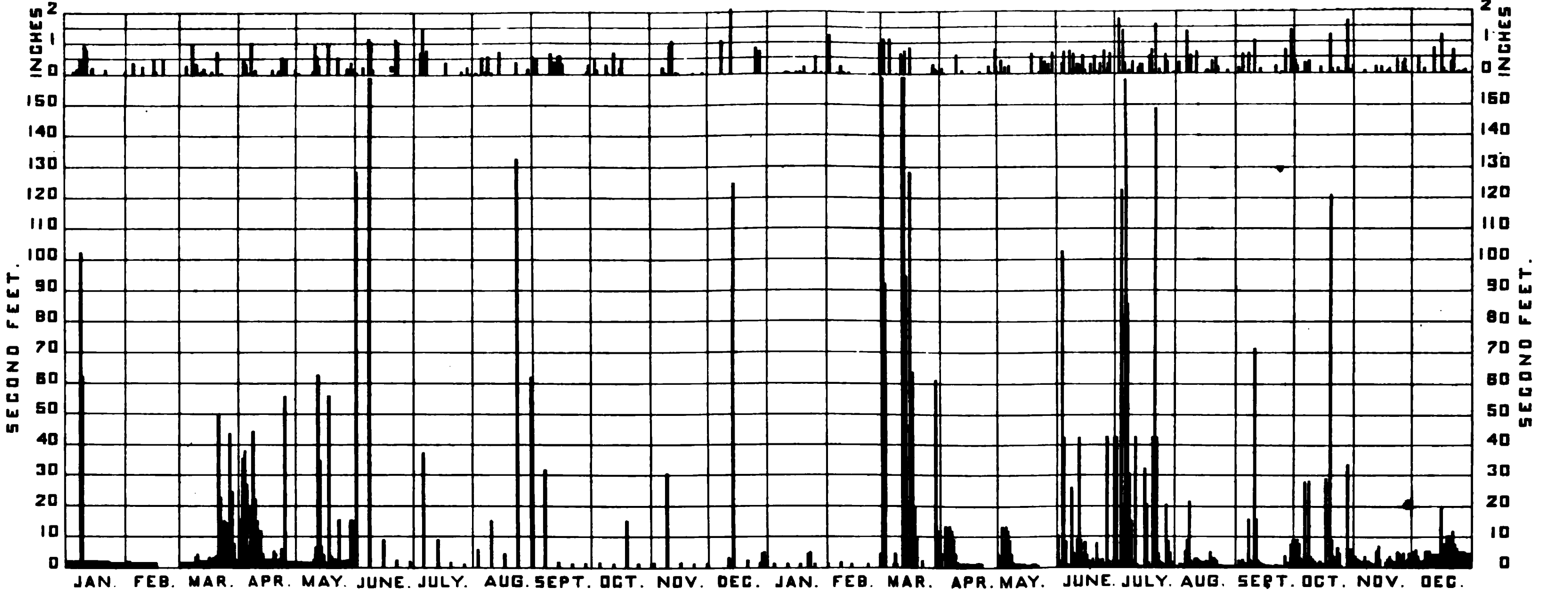
or 130 second-feet per square mile from the tributary drainage of 1.4 square miles above point of gauging; this freshet was caused by a very heavy thunder storm which raised the water in the reservoir several feet in an hour. This storage probably lessened the flood intensity at points down stream.

July 14th, in 1897, a rainfall of extreme severity caused a discharge over the masonry spillway of Beacon Reservoir near Fishkill-on-Hudson, N. Y., estimated from the known length and depth of overflow at 800 second-feet. This dam receives the run-off from a rocky precipitous forest covered basin 160 acres on .25 square mile in area. The recorded rate of discharge was equivalent to 3,200 second-feet per square mile or five inches run-off per hour. The stream remained at this stage for only a very short time.

Mean Daily Flow in Second-feet of Reel's Creek, near Utica, Oneida County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901												
1....	1.75	1.75	1.30	1.75	1.75	128.40	......	......	......	......	......	......
2....	1.75	1.75	1.30	15.30	1.75	......	......	......	......	......	1.30	......
3....	1.75	1.75	1.30	35.50	1.75	......	......	6.00	......	......	......	......
4....	1.75	1.30	1.30	38.00	1.30	......	......	......	......	......	......	......
5....	1.75	1.30	1.30	27.00	1.30	......	......	......	......	1.75	......	......
6....	1.75	1.30	1.30	6.69	1.30	......	37.50	......	......	......	......	......
7....	1.75	1.30	1.30	19.50	1.30	......	......	......	32.00	......	......	1.75
8....	1.75	1.30	1.30	44.59	1.30	209.10	......	......	......	......	......	......
9...	102.50	1.30	3.12	22.31	1.30	......	......	......	......	......	30.50	......
10....	62.00	1.30	4.38	15.30	2.48	......	......	15.30	......	......	......	......
11....	1.75	1.30	1.75	12.00	6.83	......	......	......	......	......	......	3.44
12....	1.75	1.30	1.75	12.00	62.68	......	......	......	......	1.30	......	2.81
13....	1.75	1.30	1.75	4.50	34.72	......	9.00	......	......	......	......	2.19
14....	1.75	1.30	1.75	2.48	6.70	......	......	......	1.75	......	......	124.50
15....	1.75	1.30	1.75	2.48	4.41	9.00	......	......	......	......	......	......
16....	1.75	1.30	3.41	2.48	1.75	......	......	......	......	......	1.75	......
17....	1.75	1.30	2.50	2.48	1.30	......	......	4.50	......	......	......	......
18....	1.75	*	3.12	2.48	55.80	......	......	......	......	......	......	......
19....	1.75	......	3.44	5.45	3.40	......	......	......	......	15.30	......	......
20....	1.75	......	4.06	4.87	2.48	......	1.75	......	......	......	......	......
21....	1.75	......	49.90	1.75	2.48	......	......	......	1.30	......	......	2.48
22....	1.75	......	22.80	2.48	1.75	2.48	......	......	......	......	......	......
23....	1.75	......	12.00	6.00	15.30	......	......	......	......	......	1.30	......
24....	1.30	......	15.25	2.48	1.75	......	......	132.40	......	......	......	......
25....	1.30	......	14.62	55.80	1.75	......	......	......	......	1.30	......	......
26....	1.30	......	10.88	1.75	1.75	......	......	......	......	......	......	......
27....	1.30	......	43.55	1.75	2.48	......	1.30	......	......	......	......	......
28....	1.30	......	24.50	1.75	2.48	......	......	......	1.30	......	......	1.30
29....	1.30	......	7.70	1.75	15.30	1.75	......	......	......	......	......	4.69
30....	1.30	......	2.48	1.75	15.30	......	......	......	......	......	1.30	5.00
31....	1.30	......	1.75	.....	9.00	......	......	62.00	......	......	......	......
Mean.	6.83	1.38	8.02	11.81	8.55	70.15	12.39	44.04	9.09	4.91	7.23	16.46
1902.												
1....	......	1.30	254.70	.....	4.50	10.3	42.5	0.9	0.4	9.1	3.9	3.9
2....	......	......	167.00	.....	1.30	1.6	2.0	0.8	2.2	9.1	2.9	5.4
3....	......	......	92.00	.....	13.60	103.0	128.5	1.5	1.2	7.8	2.6	6.0
4....	1.30	......	......	.....	9.00	42.5	20.6	1.4	2.4	2.9	2.2	3.9
5....	......	......	......	30.50	13.60	8.4	206.7	1.2	1.5	1.8	2.2	2.2
6....	......	......	......	.....	12.00	1.1	86.8	5.4	0.9	28.5	3.9	2.2
7....	......	......	......	2.48	9.00	0.9	30.6	9.1	15.4	3.9	2.2	2.4
8....	......	1.75	4.50	.....	4.50	26.1	15.4	21.6	2.2	28.5	2.2	5.4
9....	......	......	......	.....	1.75	4.5	2.2	2.2	1.5	9.4	1.8	5.4
10....	......	......	......	.....	1.30	3.1	42.5	1.5	71.2	11.3	1.5	5.4
11....	1.30	......	......	.....	1.30	9.1	2.2	2.8	15.4	2.2	1.1	4.4
12....	......	......	126.74	12.00	1.30	42.5	1.5	2.8	2.2	1.5	5.4	4.4
13....	......	......	209.90	.....	1.30	9.1	0.9	2.3	1.5	1.5	7.2	4.4
14....	......	......	94.50	.....	1.30	4.3	0.8	2.0	1.2	2.2	2.6	4.4
15....	......	1.30	9.98	.....	1.30	8.4	0.8	1.9	1.1	1.5	......	4.4
16....	......	......	128.30	.....	1.11	4.5	32.8	2.0	0.9	1.1	......	19.5
17....	......	......	63.30	.....	1.11	2.2	20.6	2.2	0.8	29.1	1.8	7.8
18....	1.30	......	19.50	.....	1.11	2.1	2.0	2.0	0.8	.9	2.9	7.8
19....	......	......	9.51	1.30	1.30	2.7	1.5	5.1	0.7	120.8	3.9	10.5
20....	......	......	......	.....	1.30	1.5	42.5	3.1	0.4	9.1	2.6	10.5
21....	......	......	......	1.30	1.30	7.8	149.5	3.2	1.1	3.9	2 2	10.5
22....	4.69	1.30	2.48	.....	1.11	2.4	42.5	2.2	1.1	2.9	2.2	12.0
23....	5.00	......	......	.....	*a*	1.7	5.4	0.9	0.8	6.9	5.4	7.8
24....	......	......	......	1.30	.....	2.7	2.2	0.8	0.8	4.9	4.9	6.6
25....	1.30	......	......	1.30	.....	1.4	2.0	0.7	0.7	1.9	3.9	5.4
26....	......	......	......	2.48	.....	42.5	1.5	0.7	3.8	1.1	4.9	5.4
27....	......	......	......	30.50	.....	2.0	20.6	0.7	1.5	5.4	4.3	5.4
28....	......	4.69	......	3.40	.....	1.5	9.0	0.5	1.1	38.2	7.0	5.4
29....	......	......	61:11	1.30	.....	2.4	5.1	0.5	7.7	6.	4.9	4.9
30....	......	......	12.00	42.40	.....	42.5	2.2	0.4	9.0	6.	3.9	4.9
31....	......	......	8.00	.....	.....	......	1.0	0.4	......	6.	......	4.9
Mean.	2.48	2.07	78.9	10.85	3.88	13.1	29.8	2.6	5.0	8.3	3.4	6.2

* Pipe broken in Gulf. *a* Waste gate opened. Setting weir.


PRECIPITATION AS MEASURED AT DEERFIELD RESERVOIR.

1901 Total flow at Intake Dam. 1902

Diagram showing Rain-fall and Run-off, Reel's Creek Watershed, Oneida County, N. Y.

Precipitation in Inches at Deerfield Reservoir, Oneida County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	.03					.57			.58			
2					.04							
3				.45				.05	.53	.45		
4		.42		.34		.27	.73			.15		
5	.10		.31				1.48					
6				.04			.09	.55				
7	.10			1.04		1.16	.80					
8			1.00			1.07		.10			.22	
9	.50			.17		.17		.60			.05	1.10
10		.28	.35		.10					.30		
11	.95				.95			.07	.70	.03		
12	.82		.07		.62						.98	
13			.12		.32				.42		1.10	
14			.21						.32	.72		2.12
15	.23		.05					.73	.60		.03	
16		.49							.61		.02	
17		.10					.40		.34	.20		
18			.12		.08					.50		
19			.02	.17		.28						
20												
21		.50	.77	.14		1.14						
22	.18					1.07						
23			.07	.56	.57							
24								.40			.03	
25				.50								
26							.10					
27					.22							.85
28												
29					.49		.24		.30		.03	.75
30				.17	.10			.18	.10			
31	.12				.18		.03					
Total	3.12	1.79	3.09	3.58	4.67	5.73	3.87	2.68	4.50	2.35	2.46	4.82
1902.												
1			1.15	.12	.03					.44		
2		.05	1.12	.18				.41	.20	.25		
3		1.25	.03	.03	.44		1.75					
4						.35			.62	.02		.50
5			1.12		.20	.72	1.43			.03		
6							.35	1.42		.35	.10	
7		.03			.29		.03		.65			.15
8						.75	.11	.56		.40		
9		.25	.03	.60								
10		.03				.68	.42	.05	1.05			
11	.03	.02	.65					.71				
12	.05			.10		.32					.23	.80
13	.03	.03	.75			.31	.22		.17			
14							.30			.20		
15						.54	.31				.20	
16			.85			.14		.10				1.30
17	.05							.10				.15
18		.25									.08	.05
19	.05				.65	.32	.60	.46		1.23	.15	
20							.80			.16		
21	.25			.07		.52		.48	.21			.40
22						.09	1.60	.28				.75
23					.02	.02				.16	.45	
24					.50	.32	.15		.03	.07		.05
25		.03			.30					.05	.02	
26	.02			.21	.43	.76			.75		.36	.08
27	.55			.05		.09	.62	.10		.51	.45	.11
28		1.00	.30		.35	.34	.43			1.70	.05	
29			.12			.68			1.40	.11		
30	.03		.10	.77	.72				.70		.02	
31			.02				.03			.26		
Total	1.06	2.94	6.24	2.13	3.93	6.95	9.15	4.67	5.81	5.93	2.11	3.58

WEST CANADA CREEK AT TWIN ROCK BRIDGE AND TRENTON FALLS, ONEIDA COUNTY, N. Y.

Twin Rock Bridge crosses West Canada Creek two miles above Hinckley, practically at the point of emergence of the stream from the Adirondacks. The bridge is of iron, having two spans and a length of 167.5 feet between abutments. The stream bed is of gravel and rock, and the conditions are unusually favorable for a current meter station. A gauge board was set and a record commenced on September 7, 1900. The gauge is read at 7 a. m. and at 6 p. m. each day, and the average of the two daily readings is given in the following tables:

Current Meter Discharge Measurements of West Canada Creek at Twin Rock Bridge, Herkimer County, N. Y.

DATE.	Gauge reading.	Discharge in second-feet.
September 7, 1900	0.45	182
April 11, 1901	3.20	a 1,235
May 4, 1901	4.25	a 1,423
August 8, 1901	2.81	a 604
August 10, 1901	4.88	a 1,847

a Probably affected by backwater.

Current Meter Discharge Measurements of West Canada Creek at Twin Rock Bridge, Herkimer County, N. Y.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1902.			
August 25	1.25	455	C. C. Covert.
June 17	2.34	1,142	H. R. Beebe.
June 17	2.39	1,187	H. R. Beebe.
October 10.	2.74	1,534	R. E. Horton.
June 16	2.93	1,615	R. E. Horton.
June 28	3.02	1,812	R. E. Horton.
June 28	3.45	2,131	H. R. Beebe.
June 27	4.12	3,114	H. R. Beebe.
June 27	4.52	3,402	H. R. Beebe.

During April, 1901, an unusually heavy drive of logs produced a jam in the mill pond above Hinckley dam, two miles below the gauging station. This jam remained in position through the summer and was carried out by high water December 15, 1901. The gauge readings at Twin Rock Bridge for this period are probably affected by backwater in some degree.

Black Creek enters West Canada Creek one-half mile above Twin Rock Bridge. A discharge measurement of this stream at Grant, two miles from the mouth, showed the discharge to be 62 second-feet on August 8, 1901.

The record at Twin Rock Bridge is kept by the Utica Electric Light and Power Company. This company has erected an electric power plant at Trenton Falls, four miles farther downstream. A concrete dam has been constructed, and a head of 265 feet is obtained on the turbines, which are of special design.

The relative drainage areas tributary to the different gauging stations on West Canada Creek are shown below:

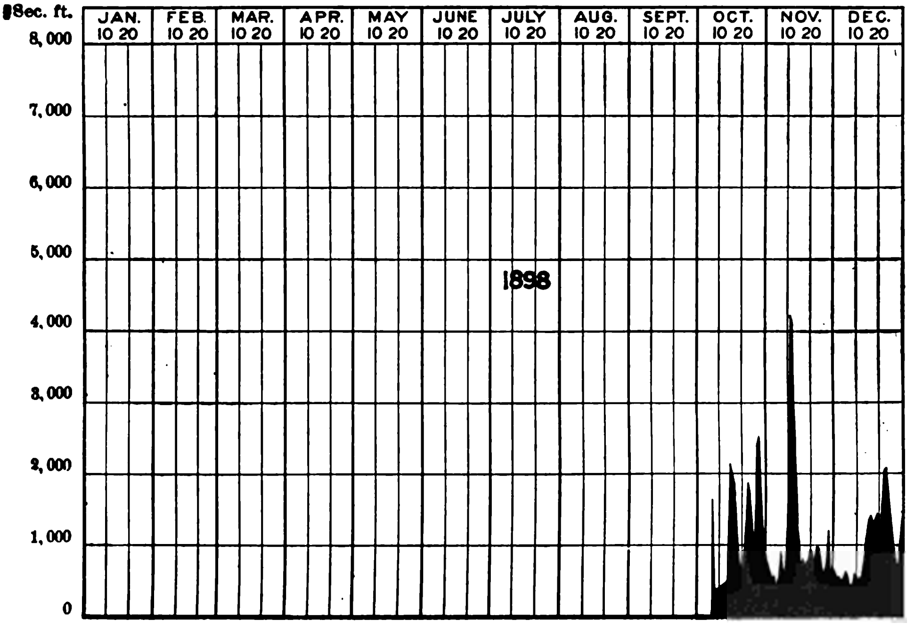
LOCATION.	Drainage area, square miles.
Mouth	569
Middleville	519
Trenton Falls	375
Twin Rock Bridge	352

Mean Daily Gauge Height, in Feet, of West Canada Creek, at Twin Rock Bridge, Oneida County, New York, for 1900.

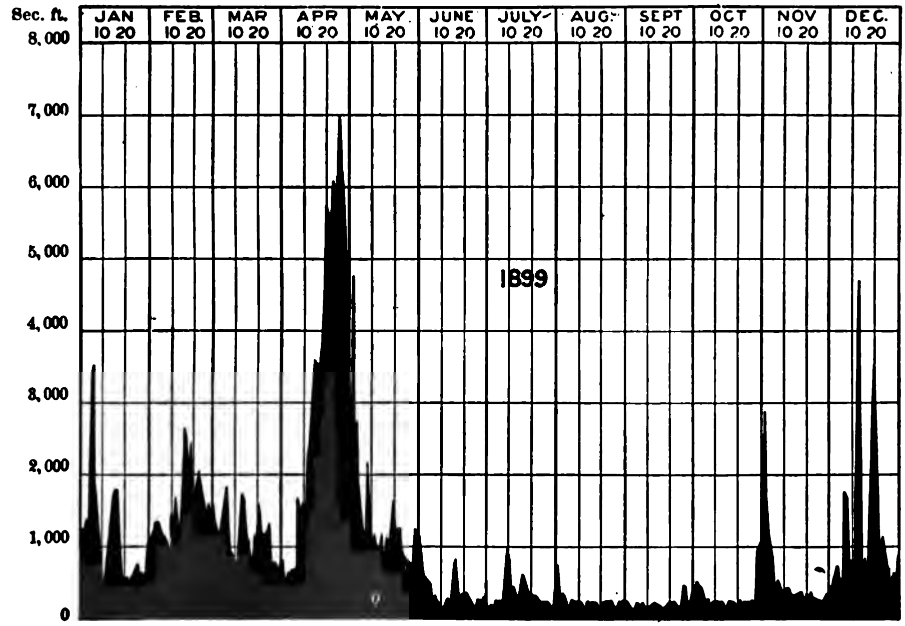
DAY.	Sept.	Oct.	Nov.	Dec.	DAY.	Sept.	Oct.	Nov.	Dec.
1	......	0.85	0.90	1.60	17	0.45	1.05	1.50	1.50
2	......	.75	1.60	1.85	18	.30	1.00	1.80	1.50
3	......	.65	1.10	2.00	19	.30	.95	5.50	1.50
4	......	.70	1.05	1.90	20	1.65	1.15	5.30	1.50
5	......	.60	1.15	1.75	21	2.90	.62	5.30	1.50
6	......	.55	1.70	1.55	22	2.35	.60	4.45	1.50
7	......	.65	4.55	1.40	23	1.50	2.30	3.75	1.75
8	......	.85	4.25	1.40	24	.95	2.45	2.00	1.70
9	0.35	.75	3.05	1.50	25	1.10	1.75	6.25	1.65
10	.32	.90	1.45	1.50	26	.90	1.70	6.20	1.60
11	.35	.85	2.05	1.50	27	.95	2.55	4.40	1.55
12	.32	.70	1.90	1.50	28	1.00	1.95	3.55	1.50
13	.35	.60	1.55	1.50	29	.85	1.15	1.90	1.50
14	.35	1.25	1.60	1.50	30	.90	1.20	1.70	......
15	.38	1.30	1.50	1.50	31	......	1.50	......	......
16	.78	1.10	1.50	1.50					

Mean Daily Gauge Height of West Canada Creek at Twin Rock Bridge.

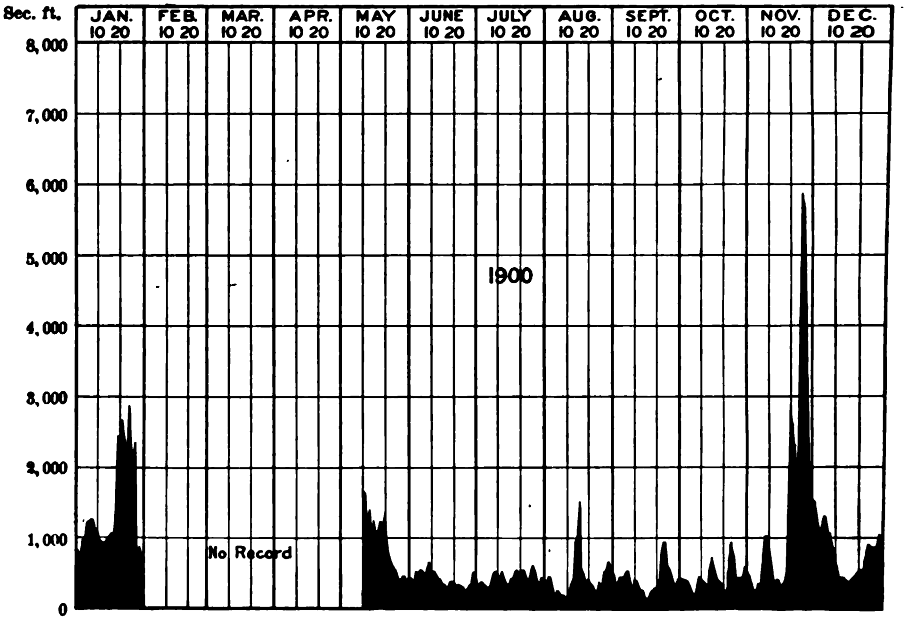
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1....	1.5	2.1	2.1	5.25	7.8	5.15	1.4	3.45	2.8	1.55	0.55	1.6
2....	1.5	2.1	2.1	5.4	7.5	4.65	1.3	3.45	2.85	1.42½	0.55	2.0
3....	1.5	2.1	2.1	5.1	6.95	5.25	2.1	2.3	2.72½	1.6	1.85	2.05
4....	1.5	2.1	2.1	4.1	6.2	4.4	1.55	2.0	2.55	1.42½	1.45	1.77½
5....	1.5	2.1	2.1	4.3	3.45	5.55	1.5	2.25	2.35	1.45	2.15	1.62½
6....	1.8	2.1	2.1	4.05	3.35	6.7	2.8	2 45	2.25	1.25	2.2	1.60
7....	1.8	2.1	2.1	3.05	2.9	6.25	2.6	2.6	1.35	1.7	2.3	1.6
8....	1.8	2.1	2.1	2.65	2.65	5.4	2.5	3.2	1.25	1.47½	2.17½	1.45
9....	1.7	2.1	2.15	3.0	2.45	3.35	2.4	3.75	1.7	1.5	2.1	1.45
10....	1.7	2.1	2.2	3.15	2.9	3.5	2.1	4.45	.60	.92½	1.7	3.05
11....	1.6	2.1	2.15	3.5	4.7	3.15	2.0	2.52½	.57½	1.2	1.85	4.25
12....	1.6	2.1	2.1	3.3	5.6	2.75	2.52½	3.07½	1.15	1.2	2.2	4.1
13....	1.6	2.1	2.0	2.95	5.15	2.7	2.3	3.0	2.9	1.9	2.52½	3.95
14....	1.6	2.1	2.95	4.4	4.0	2.25	1.5	2.85	2.6	4.2	4.2	3.2
15....	1.6	2.1	2.2	4.4	3.5	1.5	.7	2.5	2.3	3.4	4.2	15.45
16....	1.55	2.1	2.4	4.15	3.1	1.5	.55	2.35	3.3	3.3	4.3	8.3
17....	1.55	2.1	1.9	3 45	4.0	1.4	.50	2.22½	2.9	3.1	4.15	8.95
18....	1.6	2.1	1.95	3.35	4.35	1.4	2.9	2.22½	2.5	2.75	4.1	6.4
19....	1.6	2.1	1.75	4.5	4.0	1.5	2.6	1.75	2.55	2.62½	2.45	6.3
20....	2.1	2.1	1.8	4.7	4.15	4.0	2.0	.95	3.15	2.5	2.1	6.0
21....	2.1	2.1	1.9	5.75	4.25	3.2	1.35	1.22½	2.85	2.35	2.25	6.0
22....	2.1	2.1	2.0	5.4	4.1	3.5	.7	1.2	2.25	2.3	1.85	3.3
23....	2.1	2.1	2.65	5.2	4.1	4.65	.8	.92½	2.05	2.1	1.75	2.4
24....	2.1	2.1	2.85	5.6	3.2	3.5	.75	1.2	1.4	2.35	1.57½	2.22½
25....	2.1	2.1	4.3	5.4	2.75	2.6	1.0	2.3	1.1	2.47½	1.8	2.0
26....	2.1	2.1	4.8	5.75	2.65	2.1	1.4	1.7	1.2	2.3	1.85	2.0
27....	2.1	2.1	4.3	5.85	2.65	1.7	2.2	1.5	1.5	1.37½	2.4	2.0
28....	2.1	2.1	6.25	12.5	2.9	1.45	2.8	.70	1.4	1.32½	2.0	2.0
29....	2.1	......	5.3	11.85	4.0	1.3	3.95	.70	1.42½	1.15	1.65	2.0
30....	2.1	......	5.0	8.75	4.15	1.5	4.35	.42½	1.4	1.35	1.525	2.0
31....	2.1	......	6.05	......	4.15	......	3.15	.67½	......	.67½	.....	2.0
1902.												
1....	2.0	1.9	4.90	4.75	5.21	2.15	3.10	1.55	1.00	2.3	3.1	1.6
2....	2.0	1.9	6.80	3.90	3.95	2.10	3.35	1.50	0.90	1.35	2 25	1.58
3....	2.0	2.0	7.65	3.15	3.05	1.90	4.90	1.50	0.78	1.35	2.35	2.65
4....	2.0	2.0	6.40	2.40	3.15	3.25	7.05	1.43	0.70	1.2	1.45	4.55
5....	2.0	2.0	5.40	2.42	3.50	2.65	4.45	1.28	0.90	1.25	1.5	3.9
6....	2.0	2.0	4.25	2.30	2.65	1.95	3.60	1.80	1.10	1.23	1.85	3.85
7....	2.0	2.0	3.75	2.35	2.75	2.45	2.55	2.50	1.10	1.23	2.25	4.55
8....	2.0	2.0	3.30	2.37	2.30	2.10	2.55	2.33	1.45	3.0	2 05	1.95
9....	2.0	2.0	3.40	5.45	2.10	1.70	2.42	2.70	1.80	3.3	1 9	1.7
10....	2.0	2.0	3.10	5.25	2.10	2.10	2.35	2.65	1.70	2.7	1.65	1.73
11....	2.0	2.0	3.07	3.65	1.85	3.12	2.10	2.40	1.55	1.63	1.5	2.45
12....	2.0	2.0	3.5	3.42	1.70	2.80	1,53	3.15	1.05	1.4	1.65	2.45
13....	2.0	2.0	5.1	3.45	1.45	2.45	1.30	2.40	1.00	1.3	3.0	2.2
14....	2.0	2.0	6.85	3.65	1.27	2.25	1.22	1.95	1.15	1.28	3.2	2.05
15....	2.0	2.0	5.05	2.75	1.00	2.95	1.80	1.70	1.03	1.2	2.2	2.1
16....	2.0	1.9	5.70	2.50	1.00	2 90	4.00	1.45	0.90	1.23	2.1	2.65
17....	2 0	1.9	8.25	2.60	1.15	2.50	2.40	1.40	0.90	1.0	2.35	6.0
18....	2.0	1.85	7.00	2.45	1.32	1.90	2.18	1.30	0.75	.75	2.13	5.65
19....	2.0	1.68	7.25	2.35	1.32	1.62	1.90	1.55	0.60	2.25	1.75	3.5
20....	2.0	1.60	6.87	2.50	1.45	1.75	2.80	1.48	0.50	3.7	1.63	2.8
21....	2.0	1.52	3 50	2.25	1.42	1.8	4.13	1.60	0.65	4.25	1.7	2.4
22....	1.9	1.50	3.20	3.20	1.37	3.65	5.10	1.70	0.60	3.8	1 85	6.1
23....	1.8	1.90	3.80	2.75	1.30	2.95	4.28	1.68	0.60	3.25	2.1	6.35
24....	1.8	1.60	3.70	2.50	2.70	2.40	2.95	1.48	0.60	3.23	1.45	5.2
25....	1.9	1.52	3.42	2.55	3.50	1.90	2.50	1.30	0.63	2.2	1.63	4.15
26....	1.9	1.62	3.22	2 35	3.22	3.40	1.70	1.13	0.73	2 5	1.5	3.53
27....	1.9	1.37	3.05	3.10	2.85	4.30	1.43	1.00	1.00	3.0	1.63	3.35
28....	1.9	1.85	3.40	3.30	2.60	3.15	1.75	0.85	1.2	5.2	2.2	3.2
29....	1.9	......	6.30	2.42	2.50	2.55	1.95	0.80	2.5	6.5	2.1	4.0
30....	1.9	......	8.00	4.15	2.80	3.70	1.65	0.73	3.45	4.3	1.75	4.0
31....	1.9	......	6.00	......	3.10	......	1.45	1.10	......	4.65	.....	3.9



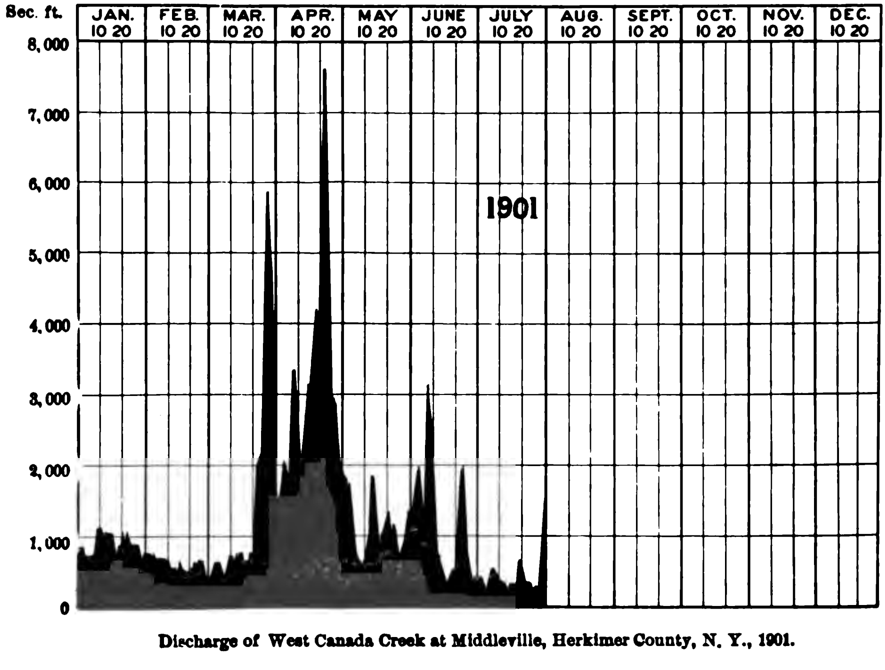
Discharge of West Canada Creek at Middleville, Herkimer County, N. Y., 1898.



Discharge of West Canada Creek at Middleville, Herkimer County, N. Y., 1899.



Discharge of West Canada Creek at Middleville, Herkimer County, N. Y., 1900.



Discharge of West Canada Creek at Middleville, Herkimer County, N. Y., 1901.

Heavy rains on frozen ground December 15, 1901, caused a freshet discharge over the Trenton Falls dam estimated at 36,300 second-feet or 96.8 second-feet per square mile.

It is possible that the intensity of this flood was increased to some extent by the failure of the Hinckley dam a short distance upstream. A high-water mark at Newport dam indicates a flood discharge for the freshet of August, 1898, of at least 22,000 second-feet, or 46.6 second-feet per square mile from the tributary drainage area of 472 square miles. In August, 1874, a freshet at Hinckley produced an estimated discharge of 21,100 second-feet or 58.6 second-feet per square mile from the tributary drainage area of 360 square miles. The freshet of August, 1898, is estimated to have produced a discharge of 12,950 second-feet or 24.9 second-feet per square mile at Middleville.

WEST CANADA CREEK AT MIDDLEVILLE, HERKIMER COUNTY, N. Y.[a]

Measurements of West Canada Creek have been made at Middleville, at the dam of the Nelson Knitting Company, which supplies power to four mills. The dam is of timber, with a nearly level crest, aside from the ice slide in the northern portion.

The principal element of uncertainty with this record in the past was considered to be leakage of the dam, etc., which had been taken at 50 second-feet. Current meter measurements were made on September 10, 1900, to determine the leakage of the dam and the low water flow of the stream at this station.

	Second-feet.
Highway bridge below dam, measured flow in main stream channel	113
Measured flow in hydraulic canal	132
Total flow from current meter measurements	245

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[a] See Water Supply and Irrigation Paper, U. S. Geol. Survey, No. 35, p. 49.

The caluculated flow from the gauge record gives the following results:

	Second-feet.
Flow over dam, gauge reading 0.67	60
Leakage previously estimated	50
Total flow in main channel	110
Calculated diversion to water wheels	131
Total flow as estimated	241

The stream bed is of gravel and cobblestones. High water and ice have washed deep holes below the toe of the dam, tending to increase the leakage. Measurements of the discharge below the dam in 1901 gave the following results:

March 28.

	Second-feet.
Metered flow in creek at highway bridge	4,559
Metered flow in power canal at highway bridge	154
Total flow past highway bridge	4,713
Metered discharge over dam	4,528
Estimated discharge of turbines	162

August 10.

	Second-feet.
Metered flow past highway bridge	965
Metered flow in power canal	96
Total flow past highway bridge	1,061

October 5.

	Second-feet.
Metered flow in creek at highway bridge	480
Metered flow in power canal at highway bridge	28
Total flow past highway bridge	510

	Second-feet.
Flow over dam by meter	320
Flow over dam, estimated	230
Difference, leakage, etc	90

Mean Daily Flow in Second-feet of West Canada Creek at Middleville, Herkimer County, N. Y.
[Drainage area, 518 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1											777	650
2											670	580
3											584	580
4											595	*539
5											450	589
6											*550	651
7										1,662	911	588
8										427	626	465
9										*404	711	483
10										398	1,679	624
11										447	4,240	*519
12										461	4,163	531
13										481	*2,410	552
14										569	1,318	742
15										2,152	1,071	1,123
16										*1,894	788	1,362
17										1,263	816	1,413
18										968	752	*1,349
19										783	800	1,374
20										689	*970	1,469
21										737	904	1,288
22										981	801	1,614
23										*1,894	990	2,072
24										1,758	983	2,083
25										1,299	775	*1,739
26										1,055	602	1,425
27										2,436	*740	1,181
28										2,554	1,224	892
29										1,580	679	711
30										*1,129	713	1,082
31										979		1,492
Mean.										1,161	1,110	1,024
1899.												
1	*1,216	1,135	1,563	821	2,979	1,114	198	273	257	*480	1,281	330
2	1,241	1,205	1,354	*523	4,760	763	*140	292	191	510	2,867	580
3	1,378	1,335	1,208	620	2,696	593	200	345	*145	470	1,744	*710
4	1,376	1,340	1,191	622	2,735	*550	116	316	145	436	1,199	710
5	3,445	*1,292	*1,348	680	1,926	531	240	237	210	337	*1,040	518
6	3,500	1,203	1,635	680	1,455	480	240	*155	205	253	831	540
7	1,858	1,101	1,835	748	*1,238	294	256	286	195	288	469	1,750
8	*1,315	1,172	1,207	1,697	1,187	314	204	262	219	*190	542	1,670
9	1,173	937	942	*1,503	2,170	258	*675	256	169	232	482	840
10	782	1,535	812	1,601	1,422	182	993	242	*145	220	390	*700
11	462	1,350	751	1.588	1,073	*130	807	246	188	234	420	640
12	786	*1,690	*1,340	2,230	1,189	283	443	214	201	210	*410	3,150
13	1,119	1,418	1,724	2,465	1,003	297	445	*125	221	239	342	4,710
14	1,132	1,227	1,632	3,228	*995	248	343	254	205	219	313	2,530
15	*1,615	1,666	1,181	3,582	1,191	753	236	216	204	*140	372	740
16	1,760	2,640	1,071	*3,513	888	839	*430	253	189	241	343	840
17	1,771	2,500	814	3,549	1,143	499	600	239	*145	238	363	*640
18	1,102	2,111	944	3,751	1,064	*320	560	235	197	235	372	1,060
19	621	*2,410	*1,060	4,477	1,183	339	479	174	208	217	*220	1,880
20	519	1,562	1,175	5,717	1,633	331	345	*110	213	152	337	3,520
21	563	1,816	1,555	5,564	*1,240	373	327	226	239	261	310	2,530
22	*535	1,966	1,412	5,381	1,274	346	225	245	238	*190	363	1,400
23	568	2,044	1,179	*6,083	996	263	*140	257	204	245	293	990
24	616	1,764	1,180	5,956	884	203	241	229	*145	225	273	*1,150
25	701	1,660	1,203	5,904	844	*155	241	254	209	238	273	900
26	763	*1,490	*1,313	6,994	801	283	241	183	476	231	*249	840
27	640	1,564	764	6,208	728	273	244	*110	433	267	312	580
28	626	1,444	795	5,779	*810	280	239	255	248	224	292	540
29	*605		762	4,969	1,255	308	171	247	213	*965	310	640
30	818		685	*4,513	1,179	275	*115	262	386	1,040	310	540
31	1,010		758		1,191		234	269		629		*890
Mean.	1,150	1,594	1,176	3,365	1,456	397	324	235	221	324	577	1,295

* *Sunday.*

Mean Daily Flow in Second-feet of West Canada Creek at Middleville, Herkimer County, N. Y. —(Concluded).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1900.		*a*	*a*	*a*								
1.....	824	......	......	......	......	415	*320	362	457	470	593	1,517
2.....	722	......	......	......	......	358	338	450	*320	469	463	*1,232
3.....	984	......	......	......	......	*530	381	450	459	426	410	1,025
4.....	1,001	......	......	......	......	490	330	315	453	401	*328	1,175
5.....	1,219	......	......	......	......	524	299	*190	464	336	420	1,325
6.....	1,227	......	......	......	......	522	289	249	494	219	491	1,325
7.....	*1,240	......	......	......	......	491	358	235	534	*193	505	1,044
8.....	1,244	......	......	......	......	557	*500	206	421	369	1,040	1,030
9.....	1,156	......	......	......	......	676	523	205	*280	467	1,164	*818
10.....	1,106	......	......	......	1,667	*480	448	168	401	404	1,149	677
11.....	972	......	......	......	1,643	536	454	200	393	339	*756	573
12.....	937	......	......	......	1,228	495	533	*363	324	327	738	483
13.....	930	......	......	......	*1,429	420	442	437	278	330	586	483
14.....	*965	......	......	......	1,037	412	350	971	270	*280	583	483
15.....	1,011	......	......	......	1,281	368	*320	1,021	176	576	575	399
16.....	1,051	......	......	......	1,069	341	439	1,516	*136	726	492	*390
17.....	1,068	......	......	......	1,127	*284	424	541	227	646	460	413
18.....	1,442	......	......	......	1,268	332	517	490	266	466	*464	413
19.....	2,400	......	......	......	1,205	389	523	*370	282	466	722	463
20.....	1,485	......	......	......	*1,362	334	487	415	291	324	1,550	502
21.....	*2,680	......	......	......	959	281	547	844	321	*170	3,087	564
22.....	2,403	......	......	......	744	316	*530	327	818	290	2,796	559
23.....	2,006	......	......	......	637	298	488	269	*947	299	2,496	*560
24.....	2,874	......	......	......	595	*284	349	258	940	778	2,024	812
25.....	2,396	......	......	......	544	273	511	398	608	958	*3,245	942
26.....	2,093	......	......	......	437	219	636	*320	574	727	6,103	898
27.....	2,394	......	......	......	*390	306	567	506	464	461	5,837	900
28.....	*730	......	......	......	466	326	445	551	364	*460	3,068	900
29.....	870	......	......	......	423	520	*373	674	286	464	2,150	900
30.....	780	......	......	......	380	431	481	599	*320	454	1,794	*1,020
31.....	530	......	......	......	413	......	386	534	.....	594	......	955
Mean.	1,323	......	......	......	924	406	451	463	419	448	1,536	800
1901.								*b*	*b*	*b*	*b*	*b*
1.....	849	773	489	1,571	1,802	1,401	424	.....	.....	......	......	......
2.....	852	772	535	1,574	1,672	*1,505	424	.....	.....	......	......	......
3.....	852	*705	*654	1,732	1,712	1,919	344	.....	.....	......	......	......
4.....	716	769	666	2,057	1,462	1,999	257	.....	.....	......	......	......
5.....	715	666	677	1,965	*1,055	1,529	304	.....	.....	......	......	......
6.....	*710	673	534	1,878	832	1,279	514	.....	.....	......	......	......
7.....	716	670	446	*2,145	712	2,719	*545	.....	.....	......	......	......
8.....	776	668	489	3,354	682	3,179	524	.....	.....	......	......	......
9.....	1,106	670	671	3,361	657	*2,515	474	.....	.....	......	......	......
10.....	1,109	*605	*714	2,426	682	1,759	424	.....	.....	......	......	......
11.....	1,106	683	718	2,184	882	1,209	369	.....	.....	......	......	......
12.....	1,035	579	630	1,955	*1,055	869	369	.....	.....	......	......	......
13.....	*1,069	576	721	2,323	1,862	703	359	.....	.....	......	......	......
14.....	1,048	574	720	*2,738	1,802	577	*265	.....	.....	......	......	......
15.....	1,048	480	780	3,164	1,582	463	314	.....	.....	......	......	......
16.....	1,048	674	624	3,101	922	*345	314	.....	.....	......	......	......
17.....	966	*566	*616	3,465	852	373	314	.....	.....	......	......	......
18.....	714	550	629	3,735	1,082	463	314	.....	.....	......	......	......
19.....	894	501	780	4,189	*1,135	513	624	.....	.....	......	......	......
20.....	*895	499	783	3,981	1,292	413	664	.....	.....	......	......	......
21.....	1,052	589	997	*3,232	1,322	1,053	*475	.....	.....	......	......	......
22.....	991	589	1,999	7,621	1,082	1,713	369	.....	.....	......	......	......
23.....	1,051	641	2,096	7,605	1,162	*1,935	344	.....	.....	......	......	......
24.....	921	*615	*2,202	5,514	1,022	1,997	329	.....	.....	......	......	......
25.....	881	678	3,099	4,186	852	1,243	254	.....	.....	......	......	......
26.....	881	630	5,523	2,759	*745	743	254	.....	.....	......	......	......
27.....	*895	628	5,868	2,982	812	503	269	.....	.....	......	......	......
28.....	893	449	4,782	*2,829	922	333	*235	.....	.....	......	......	......
29.....	774	......	......	2,132	1,162	413	624	.....	.....	......	......	......
30.....	673	......	......	2,051	1,335	*255	1,134	.....	.....	......	......	......
31.....	773	......	......	......	1,390	......	1,464	.....	.....	......	......	......
Mean.	871	624	1,330	3,167	1,114	1,197	448	.....	.....	......	......	......

a No record or February, March and April. *b* Record not available. *Sunday.

Mean Monthly Run-off of West Canada Creek at Middleville, Herkimer County, N. Y.

[Drainage area, 518 square miles.]

IN SECOND-FEET.

MONTH.	1898.	1899.	1900.	1901.
January	......	1,150	1,366	871
February	......	1,594	......	624
March	......	1,176	......	1,330
April	......	3,365	......	3,167
May	......	1,456	924	1,114
June	......	397	406	1,197
July	......	324	451	448
August	......	235	463	....
September	......	221	419	....
October	1,161	324	448	....
November	1,110	577	1,536	....
December	*1,024	1,259	800	....

IN SECOND-FEET PER SQUARE MILE.

MONTH.	1898.	1899.	1900.	1901.
January	......	2.21	2.63	1.68
February	......	3.07	......	1.20
March	......	2.26	......	2.57
April	......	6.48	......	6.12
May	......	2.80	1.78	2.15
June	......	.76	.78	2.31
July	......	.62	.87	.86
August	......	.45	.89	....
September	......	.52	.80	....
October	2.24	.62	.86	....
November	2.14	1.11	2.97	....
December	1.97	2.43	1.54	....

IN INCHES ON DRAINAGE AREA.

MONTH.	1898.	1899.	1900.	1901.
January	......	2.54	3.03	1.93
February	......	3.19	......	1.25
March	......	2.60	......	2.96
April	......	7.23	......	6.85
May	......	3.22	2.05	2.48
June	......	.85	.87	2.47
July	......	.71	1.00	.99
August	......	.52	1.02	....
September	......	.58	.89	....
October	2.58	.71	.99	....
November	2.40	1.23	3.33	....
December	2.27	2.80	1.77	....

The lowest water in this stream occurs Sundays, when the flow is held back as pond storage by dams above Middleville. Aside from this, the most notable low water period was September 2 to 12, inclusive, 1889, the mean flow at Middleville for 11 days being 183 second-feet or 0.35 second-foot per square mile. Owing to a large and apparently increasing loss by leakage at this station, the record has been discontinued.

EAST CANADA CREEK AT DOLGEVILLE, HERKIMER COUNTY, N. Y.

This creek rises in Hamilton County and flows in a southerly direction between Herkimer and Fulton Counties into Mohawk River at East Creek. A portion of the stream and drainage area are included on the Little Falls topographic atlas sheet of the United States Geological Survey. Observations are taken at High Falls near Dolgeville, about seven miles from the outlet of the stream. The gauging station is located at the dam of the Herkimer County Light and Power Company. Readings of the depth on the crest are taken from a vertical gauge board attached to the bulkhead, 6 feet upstream, twice each day by J. M. Kelley. The mean of the readings is used in computing the discharge. A record is also kept of the run of the water wheels and the elevation of water in the tailrace.

The dam is of rubble masonry 19 feet high, and has a flat crest 6 feet in width and 190.25 feet long between abutments. The elevation of the upstream edge of the crest is one foot below that of the lip. The impounded water is conducted to the power house, 500 feet below the dam, through a wrought iron flume 10 feet in diameter. Prior to June 1, 1899, the discharge over the dam was computed from a discharge curve calculated by the use of coefficients derived from Cornell University Experiment No. 13[a]. The record since June 1, 1899, has been computed from a revised discharge curve based on Freeman's experiments on a model of the round-crested portion of the Croton Dam, which apparently corresponds closely with the ogee section of the Dolgeville Dam as regards friction on the crest, vertical contraction of the nappe, and siphonage.[b] The flow through the turbines for this period has also been computed from current meter measurements made in the tailrace of the electric power plant, instead of from the manufacturers rating tables for the water wheels as formerly. The effect of these changes has been to slightly increase the extremes of flow, both as regards high and low water. The estimated flow for mean stages remaining substantially the same.

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[a] Water Supply and Irrrigation Paper, U. S. Geol. Survey, No. 35, p. 52.

[b] See Report on New York's Water Supply 1900, by John R. Freeman, C. E., p. 137.

During October, 1901, pins were set in the crest of the dam enabling flashboards to be put on. The dam is practically water tight and no allowance is made for leakage. The discharge over the flashboards is calculated by means of the Francis Formula.

The turbines are of a special Victor cylinder gate type; the two main wheels are 36 inches in diameter each and their speed is controlled by Lombard governors. The third wheel is 15 inches in diameter and drives the exciter. The following table shows the results of current meter measurements made from a bridge across the tailrace below the power plant. Only one of the two 36-inch turbines was running in each instance, together with a 15-inch exciter wheel. The latter runs at a sensibly constant width of gate opening at all times. The head on the wheels was 72 feet. Observations on the wheel gate openings were taken at the beginning and end of each measurement and the average is given in the table:

DATE.	Measured flow in tailrace, second-feet.	Gate opening of 36-inch wheel.	Wheel number.
1900.			
May 22	84	0.50	2
July 27	76	0.38	2
July 29	63	0.28	1
August 9	80	0.38	1

The following measurements of the total discharge of the stream, in comparison with the calculated flow, were also made:

DATE.	Total flow, second-feet.	Flow in tailrace, second-feet	Flow over dam, second-feet.
1900.			
May 22	412	84	328
July 27	452	76	376
August 7	108	80	[a] 28

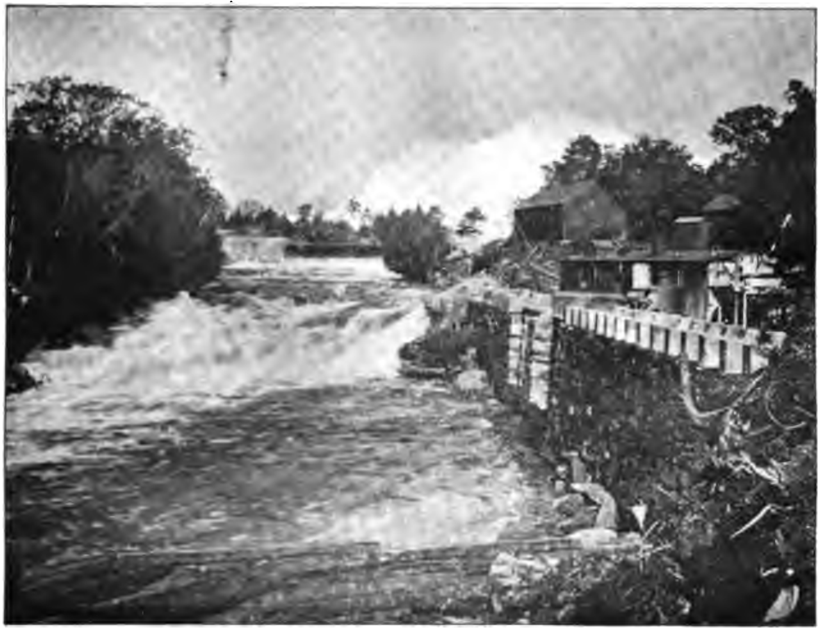
[a] Measured in stream channel above point confluence with tailrace.

DATE.	Crest-gauge reading feet.	Flow over dam, second-feet.	Flow in tailrace, second-feet.	Total flow, second-feet.
1900.				
May 22	0.69	282	84	366
July 27	0.79	362	84	446
August 7	0.20	29	78	107

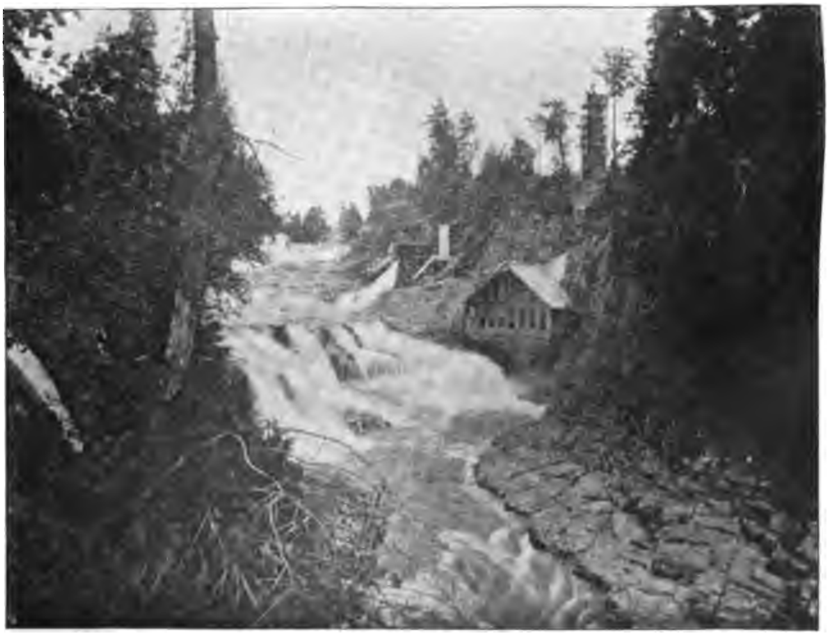
The total flow in the first two cases was measured at Dolgeville bridge one mile above the dam. The difference between the observed and calculated flows in the first instance is probably due to pond storage. The accompanying table of mean daily flow shows the amount of water passing down the stream from the dam each day. The discharge of the stream at High Falls represents the total water yield of the tributary drainage area, with the exception of water diverted for the municipal supply of Little Falls and Dolgeville.

Spruce Creek is the principal tributary of the East Canada Creek. It enters East Canada Creek one mile above Dolgeville and drains an area of 50 square miles. Water is diverted from this stream at Diamond Hill and from Beaver Creek, one of its tributaries, and is carried to Little Falls through a vitrified conduit nine miles in length. The water supply of Dolgeville is taken from Cold Brook, a tributary of East Canada Creek. No allowance for diversion for water supply has been made in computing the run-off for East Canada Creek.

Just below the foot of Spruce Creek reservoir at Diamond Hills occurs a fall of 180 feet in about 2,000 feet. At Salisbury Center, farther downstream, occurs a second fall of 85 feet in 900 feet, a number of water power privileges being developed at this point. There are a total of 12 dams on Spruce Creek, giving an aggregate fall of about 180 feet. East Canada Creek has a total fall of 445 feet from the crest of the dam at Dolgeville to the mouth of the stream. This includes a large amount of undeveloped fall.



East Canada Creek: Upper Fall, with 18 feet concrete dam and 1,100 feet flume to stand-pipe and power-house shown below 1902.



East Canada Creek: Beardslee Falls and Power House, East Creek, Herkimer County, N. Y. Typical Power Development.

TYPICAL DEVELOPMENT OF POWER BY PRIVATE ENTERPRISE.

The successful development of power on East Canada Creek, which flows from the Adirondack foot-hills into the Mohawk River 28 miles east of Utica, is worthy of comment as affording an interesting example of what may be done by private enterprise at many other places in New York State.

Beardslee Falls, two miles from the mouth of East Canada Creek, consisted of two cascades falling over calciferous sand rock and offering to the owner of the surrounding property, Mr. G. R. Beardslee, an opportunity to develop a valuable electric power. This has been done by him at each of the two cascades, which gave 55 feet head at the lower and first-developed station, and 120 feet head at the upper station. Both are shown on the accompanying pictures.

The first installation consists of two 180 kilowatt generators direct-connected to turbine wheels and generating three-phase current at 2000 volts, 60 cycles, and with one d. c. exciter direct-connected to a small turbine.

The development of the upper fall has required the building of an 18-foot concrete dam from which a 6-foot flume 1100 feet long takes the water to a stand-pipe which with a relief valve on the end of the trunk, regulates the pressure of the head of water to about 120 feet which operates a 800 H. P. turbine wheel which is direct-connected to a 450 kilowatt generator which also generates a three-phase current at 2,000 volts, 60 cycles, with a d. c. exciter direct-connected to a small turbine.

The current from both these stations is stepped-up to 15,000 volts for transmission to sub-stations at St. Johnsville, four miles, Fort Plain, 10 miles, and Canajoharie, 14 miles; at these sub-stations the high-tension current is stepped-down from 15,000 volts alternating current to 2,000 volts alternating current for distribution in the street and for supply to the usual smaller transmitters by which it is reduced to 200 volts for power circuits and to 110 for lighting circuits. The load consists of arc and incandescent lights and induction motors, the whole being entirely on an alternating current basis of three-phase transmission and two phase distribution, no direct current being generated or supplied.

The total current thus generated and distributed is about 1,080 H. P. which is thus supplied to St. Johnsville, Fort Plain, Nelliston, Canajoharie, Palatine Bridge and Ingham's Mills at which places there are demands for increased supply of electric power and light.

Blue Falls on this same stream between Ingham's Mills and Dolgeville, consists of a natural descent of 30 feet and is undeveloped.

Principal Developed Water Powers on East Canada Creek. Herkimer County, N. Y., 1901.

Number of dam from mouth.	LOCATION.	Effective head in feet.	Manufacture.
1	East Creek (G. R. Beardslee)	120	Generation of electricity
2	Ingham's Mills	10	Grist mill.
3	High Falls	72	Generation of electricity.
4	Dolgeville	20	Felt.
5	Stratford	....	Saw mill, piano factory.

Flood Discharge of East Canada Creek at Dolgeville, Herkimer County, N. Y.

DATE.	Second-feet.	Second-feet per square mile.
August 25, 1898	6,330	24.7
April 22, 1901	4,775	18.7
April 19, 1900	5,750	22.6
December 15, 1901	12,150	47.4

Mean Daily Flow in Second-feet of East Canada Creek at Dolgeville, Herkimer County, N. Y.
[Drainage area, 256 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	275	503	372
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	*330	478	372
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	275	443	372
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	270	363	*372
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	310	343	372
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	330	*395	372
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	290	398	Ice on crest of dam.
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	280	378	
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	*213	398	
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	252	648	
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	242	3,233	
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	267	1,037	
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	287	*1,620	
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	322	1,360	
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,422	1,110	
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	*1,073	850	
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	690	590	
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	465	540	
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	447	540	
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	477	*630	400
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	452	570	650
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	637	535	775
23	.....	.....	.....	.....	.....	.....	.....	.....	485	*1,323	500	1,275
24	.....	.....	.....	.....	.....	.....	.....	.....	1,180	1,082	465	975
25	.....	.....	.....	.....	.....	.....	.....	.....	*943	832	440	*700
26	.....	.....	.....	.....	.....	.....	.....	.....	680	762	370	600
27	.....	.....	.....	.....	.....	.....	.....	.....	625	1,222	*305	600
28	.....	.....	.....	.....	.....	.....	.....	.....	465	1,082	235	500
29	.....	.....	.....	.....	.....	.....	.....	.....	370	877	235	400
30	.....	.....	.....	.....	.....	.....	.....	.....	355	*635	279	450
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	602	.....	600
Mean	.....	.....	.....	.....	.....	.....	.....	.....	638	581	689	564
1899.												
1	*486	472	512	462	1,701	384	116	118	109	*135	1,046	134
2	486	462	447	*359	1,401	294	*82	192	145	118	1,674	292
3	530	447	372	355	1,301	218	112	210	*145	106	874	*335
4	530	492	422	412	1,261	*212	79	139	78	106	757	388
5	1,320	*370	*833	452	1,006	206	106	90	78	94	*648	282
6	1,390	402	852	512	771	200	103	*81	71	89	540	234
7	1,135	397	787	642	*474	194	126	118	68	89	404	152
8	*902	397	682	922	421	234	215	112	67	*94	372	152
9	922	397	542	*713	371	194	*324	100	67	92	340	132
10	722	372	472	822	371	194	394	106	*67	89	322	*195
11	622	372	447	952	421	*183	270	126	67	77	282	258
12	542	*348	*550	1,217	401	194	104	143	74	75	*258	2,000
13	502	410	742	1,642	431	194	194	*123	67	74	234	3,029
14	562	462	772	2,152	*534	206	194	103	67	74	234	1,530
15	*1,342	502	722	2,972	601	264	175	83	67	*74	234	1,094
16	1,187	502	602	*2,077	541	249	*304	78	67	74	288	914
17	1,167	397	562	2,512	441	175	374	104	*67	77	258	*733
18	1,942	402	472	2,682	601	*134	264	78	67	118	234	1,325
19	822	*370	*490	3,532	811	239	175	76	67	100	*234	1,947
20	742	447	542	4,182	741	161	126	*75	74	103	234	676
21	642	477	572	4,472	*674	274	119	74	74	100	208	1,422
22	*542	590	602	3,472	601	206	100	74	74	*90	292	874
23	572	992	602	*3,791	541	174	*112	67	74	81	292	757
24	552	742	702	3,992	471	133	106	74	*74	100	184	*648
25	672	512	672	3,992	421	*112	110	94	74	94	152	542
26	672	*460	*520	4,132	391	152	135	74	192	94	*148	436
27	642	742	447	3,782	371	152	111	*44	192	89	143	330
28	602	742	492	3,592	*324	144	135	74	139	89	143	282
29	*542	.....	472	3,017	391	119	115	74	126	*266	134	282
30	522	.....	492	*2,141	373	119	*101	74	152	372	134	254
31	472	.....	472	.....	421	.....	87	74	.....	246	.....	*259
Mean	816	439	519	1,978	633	196	166	97	92	112	377	706

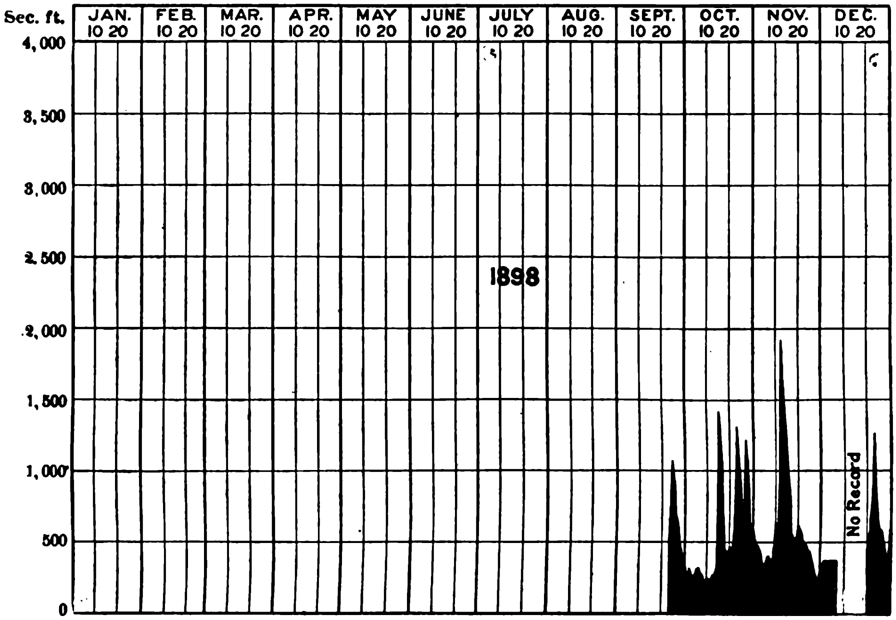
*Sunday.

Mean Daily Flow in Second-feet of East Canada Creek at Dolgeville, Herkimer County, N. Y. —(Continued).

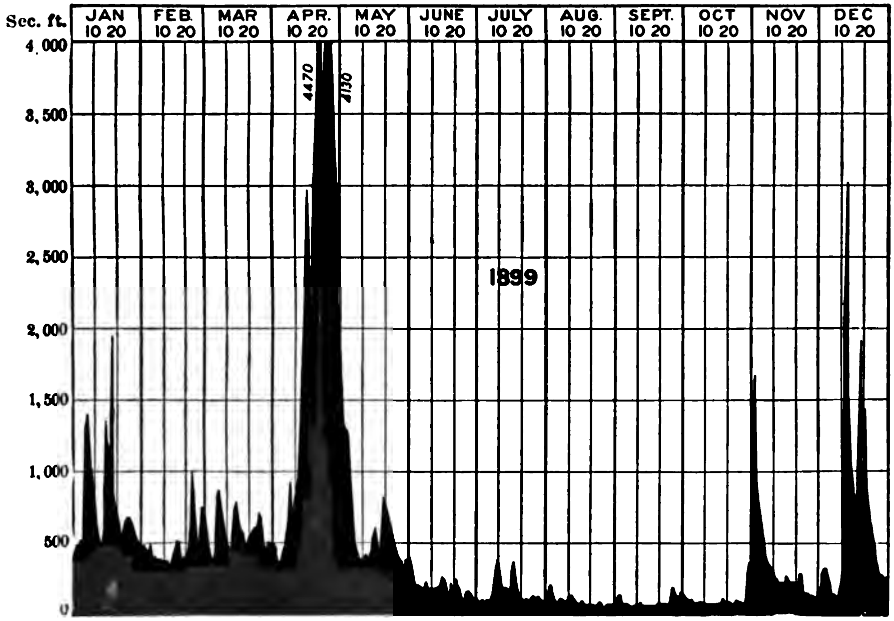
[Drainage area, 256 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1......	264	288	252	*631	1,476	*a*	*130	153	132	120	*a*	*a*
2......	264	288	240	794	1,188	*a*	112	126	*151	185	242	**a*
3......	288	288	252	914	800	*a*	112	110	129	145	218	*a*
4......	288	*288	*227	914	610	*a*	115	111	190	144	*194	*a*
5......	300	288	240	914	474	591	118	*93	167	110	242	1,192
6......	346	266	192	1,626	*410	394	152	82	149	116	218	844
7......	*346	264	152	2,321	346	372	184	89	157	*100	242	614
8......	410	288	192	*2,714	474	608	*193	98	118	94	632	614
9......	410	800	258	1,374	610	827	200	108	*118	99	722	*577
10......	372	718	340	1,094	800	*643	182	98	73	94	582	614
11......	362	*718	*321	1,002	610	460	167	87	152	85	*432	279
12......	318	718	306	1,012	546	406	145	*111	142	84	398	279
13......	300	3,759	270	1,020	*454	376	132	192	142	84	*a*	224
14......	*258	4,320	234	1,020	362	394	124	396	136	*81	*a*	224
15......	264	2,467	234	*1,197	342	376	*137	274	128	238	*a*	210
16......	252	1,632	192	1,374	342	335	150	250	*93	205	*a*	*82
17......	240	1,232	152	1,926	288	*304	162	185	117	199	*a*	63
18......	682	*930	*173	4,626	288	274	202	167	104	186	**a*	210
19......	546	646	262	5,335	288	256	190	*133	95	180	*a*	215
20......	960	562	306	4,917	*264	256	158	92	73	185	1,005	345
21......	*1,704	578	340	4,842	240	250	310	110	196	*158	1,197	215
22......	1,380	540	340	*4,368	288	246	*252	111	184	153	1,148	215
23......	1,144	709	340	3,895	288	326	194	142	*130	171	1,016	*342
24......	1,012	562	340	3,095	288	*300	374	117	154	582	713	310
25......	820	*470	*340	2,840	276	274	686	117	99	510	*1,146	438
26......	709	378	306	2,355	264	294	767	*77	*a*	322	3,802	345
27......	604	346	282	2,243	*a*	294	422	92	*a*	350	3,164	345
28......	*508	312	282	1,586	*a*	300	276	223	*a*	*306	1,689	317
29......	410	.....	306	*1,506	*a*	300	*219	136	*a*	292	1,128	317
30......	346	.....	420	1,207	*a*	149	162	181	**a*	268	929	*252
31......	346	.....	468	......	*a*	......	110	151	.....	*a*	......	263
Mean.	531	879	276	2,086	486	370	221	144	133	195	957	368
1901.												
1......	306	957	158	977	686	787	219	162	*304	210	......	*208
2......	239	950	167	1,107	550	*892	201	162	275	213	......	275
3......	205	*200	*216	1,272	446	934	179	128	332	322	*	341
4......	180	197	198	1,541	414	974	......	*119	292	284	145	306
5......	227	219	190	1,539	*372	749	......	......	244	234	145	268
6......	*141	207	196	1,750	322	676	......	......	171	*	181	261
7......	157	205	188	*2,373	......	......	*	256	136	192	173	222
8......	180	205	226	2,470	......	......	321	270	*85	192	180	*256
9......	199	205	216	2,545	.....	*1,342	267	220	97	192	165	271
10......	199	*240	*264	2,416	.....	1,006	279	210	126	161	*91	886
11......	197	197	278	1,791	292	804	226	*178	148	192	115	1,671
12......	227	197	344	1,903	*250	632	214	226	244	192	523	1,291
13......	*248	191	......	2,725	1,233	518	192	194	352	*	1,231	936
14......	307	166	......	*2,817	994	446	*160	136	270	507	863	1,466
15......	289	157	......	2,783	767	414	161	162	*508	542	635	*9,990
16......	287	148	......	2,723	724	*308	159	414	454	483	490	2,301
17......	329	*212	*	2,725	614	244	170	266	390	233	*517	1,326
18......	281	189	290	2,860	614	232	161	*	350	312	590	911
19......	281	189	382	2,723	*646	250	161	151	292	322	388	656
20......	*306	209	364	2,605	944	566	143	162	220	*	388	591
21......	241	217	556	*2,317	704	478	*120	162	220	282	404	506
22......	239	197	765	4,775	614	478	91	210	*160	246	378	*340
23......	239	189	804	3,475	686	*802	127	202	180	234	338	446
24......	227	*200	*767	2,362	614	767	115	194	196	234	*318	391
25......	239	166	1,104	1,683	614	517	115	*159	181	200	451	341
26......	205	175	1,983	1,017	*508	390	127	160	167	192	386	336
27......	*248	189	2,724	975	484	350	127	160	158	*	248	401
28......	217	180	1,860	*882	478	292	*120	171	158	186	221	398
29......	207	.....	1,514	843	688	268	157	138	*290	170	239	*598
30......	197	.....	1,148	845	842	*244	193	153	478	154	271	385
31......	239	.....	*1,060	......	886	......	231	200	.....	128	......	881
Mean.	235	248	691	2,094	629	564	174	190	249	252	359	935

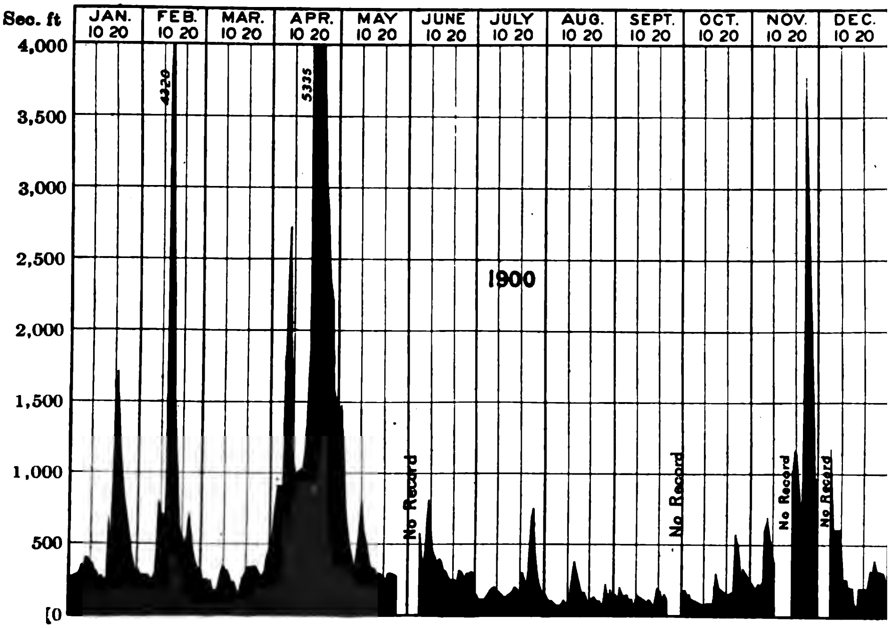
* Sunday. *a* No record.



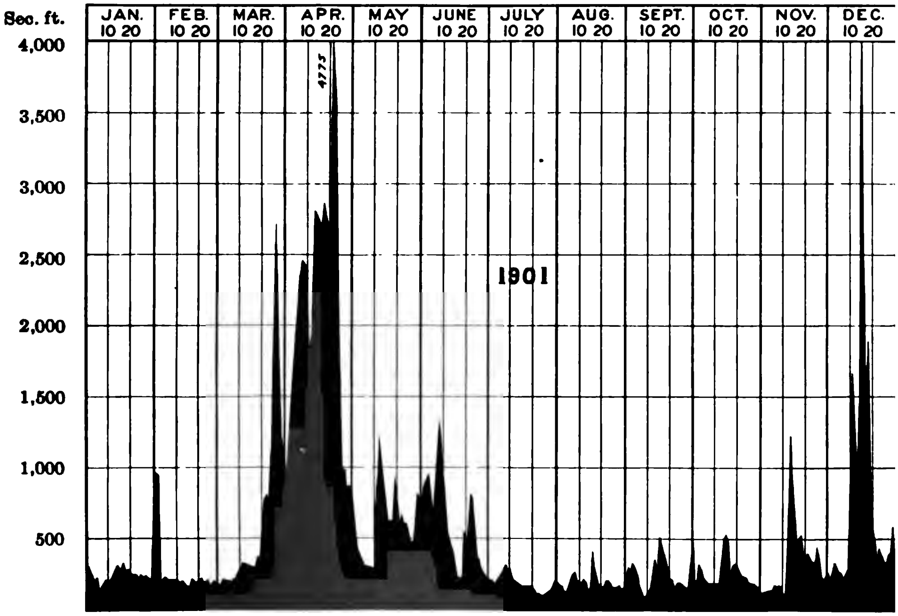
Discharge of East Canada Creek at Dolgeville, Herkimer County, N. Y., 1898.



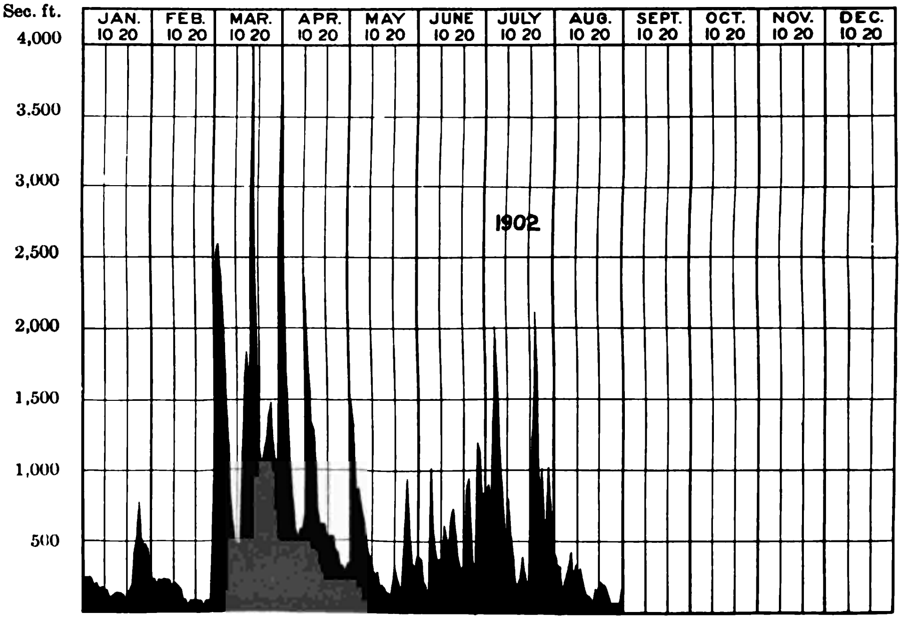
Discharge of East Canada Creek at Dolgeville, Herkimer County, N, Y., 1899.



Discharge of East Canada Creek at Dolgeville, Herkimer County, N. Y., 1900.



Discharge of East Canada Creek at Dolgeville, Herkimer County, N. Y., 1901.



Discharge of East Canada Creek at Dolgeville, Herkimer County, N. Y., 1902.

Mean Daily Flow in Second-feet of East Canada Creek at Dolgeville, Herkimer County, N. Y.
—(Concluded).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	241	236	2,541	1,721	1,333	*373	916	339	.....	639	1,033	497
2	241	*190	*2,620	1,322	881	216	796	334	74	558	827	473
3	254	236	2,370	1,102	883	187	1,364	*139	105	502	673	466
4	239	231	1,954	774	*756	86	2,037	209	103	438	592	892
5	*180	236	1,429	572	693	1,032	1,562	264	115	396	575	748
6	211	236	1,200	*532	549	579	*1,143	330	117	499	593	819
7	166	236	791	583	522	437	869	436	106	578	601	665
8	166	236	638	581	418	*376	635	246	187	711	578	880
9	171	*175	*482	682	362	381	435	337	151	619	570	638
10	159	211	483	2,363	296	341	813	*264	355	477	476	646
11	159	196	467	1,689	*264	621	538	319	297	401	434	1,228
12	*100	181	1,101	1,329	281	524	402	241	154	29	508	956
13	121	156	1,633	*1,281	192	458	*232	160	132	412	687	629
14	129	81	1,798	1,109	192	669	205	127	100	545	688	607
15	136	81	1,645	736	171	*738	245	121	135	497	684	1,332
16	136	*40	*1,886	620	139	581	394	107	293	420	655	1,320
17	136	81	4,307	622	133	420	302	*64	251	417	561	2,033
18	133	81	2,796	620	*110	349	231	166	201	411	549	1,954
19	*95	81	1,574	539	221	298	196	160	201	1,971	596	1,333
20	136	81	1,200	*539	327	365	*994	219	221	1,732	561	1,092
21	159	81	1,046	539	249	857	1,349	209	10	1,283	505	1,148
22	216	81	1,167	542	192	*956	2,131	193	101	856	549	2,516
23	451	*40	*1,236	434	135	619	1,381	160	165	750	492	1,921
24	526	81	1,429	422	460	363	769	*	218	681	422	1,495
25	781	81	1,489	331	*954	297	1,029	67	172	760	381	1,675
26	*530	81	1,200	332	708	1,219	709	67	662	628	436	864
27	486	511	1,079	*290	499	1,143	*617	67	507	648	532	822
28	481	736	1,046	342	340	827	1,029	64	418	865	626	708
29	456	.....	2,631	344	327	*739	714	64	973	3,572	563	770
30	331	.....	*3,855	1,510	410	801	508	163	853	2,834	609	720
31	231	.....	3,276	......	435	......	383	*	.....	1,656	......	638
Mean.	257	178	1,689	813	433	565	804	194	246	864	585	1,049

* Sunday.

Mean Monthly Run-off of East Canada Creek at Dolgeville, Herkimer County, N. Y.
[Drainage area, 256 square miles.]

MONTH.	SECOND-FEET.				
	1898.	1899.	1900.	1901.	1902.
January	......	816	531	235	257
February	......	439	879	248	178
March	......	519	276	691	1,689
April	......	1,978	2,086	2,094	813
May	......	633	486	629	101
June	......	196	370	564	565
July	......	166	221	174	804
August	......	97	144	190	194
September	638	92	133	249	246
October	581	112	195	252	864
November	689	377	957	359	585
December	564	706	368	935	1049

Mean Monthly Run-off of East Canada Creek at Dolgeville, Herkimer County, N. Y.—(Concluded).

MONTH.	SECOND-FEET PER SQUARE MILE.				
	1898.	1899.	1900.	1901.	1902.
January	......	3.19	2.08	0.92	1.00
February	......	1.71	3.43	0.97	0.69
March	......	2.03	1.08	2.69	6.59
April	......	7.72	8.15	8.15	8.17
May	......	2.47	1.90	2.45	0.39
June	......	0.76	1.44	2.20	2.59
July	......	0.65	0.86	0.68	3.14
August	......	0.38	0.56	0.74	0.76
September	2.49	0.36	0.52	0.97	0.96
October	2.27	0 43	0.76	0.98	8.36
November	2.69	1.47	3.73	1.40	2.28
December	2.20	2.72	1.44	3.65	4.10

MONTH.	INCHES ON DRAINAGE AREA.				
	1898.	1899.	1900.	1901.	1902.
January	......	3.67	2.39	1.06	1.15
February	......	1.77	3.56	1.01	0.72
March	......	2.34	1.24	3.09	7.35
April	......	8.65	9.12	9.12	8.65
May	......	2.84	2.19	2.81	0.45
June	......	0.85	1.60	2.46	2.99
July	......	0.75	0.99	0.78	3.50
August	......	0.43	0.64	0.85	0.84
September	2.79	0.40	0.58	1.09	1.07
October	2.61	0.49	0.87	1.13	3.87
November	3.01	1.64	4.18	1.56	2.28
December	2.53	3.13	1.66	4.20	4.71

The most notable low water period was September 13th to 16th inclusive, 1899, the average volume of flow being 67 second feet or 0.3 second-foot per square mile for four days.

DRAINAGE AREAS OF EAST CANADA CREEK.

LOCATION.	Square miles.
Above High Falls	256
Above mouth	283

MOHAWK RIVER AT LITTLE FALLS, HERKIMER COUNTY, N. Y.[a]

This gauging station is located at the lower, or Gilbert's Dam, at Little Falls.

The dam is of masonry, having the form of a circular arc in plan, and furnishes power for the Astoronga Knitting Mill and the Little Falls Paper Company's Mills. In the Astoronga Knitting Mill there are installed two turbines, one 43 inches and the other 54 inches in diameter, built by T. H. Risdon & Co., Mount Holly, N. J. In the Little Falls Paper Company's Mill are three Camden turbines, and one 60-inch Day turbine, built in Little Falls.

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[a] See Water Supply and Irrigation Paper, U. S. Geol. Survey, No. 35, p. 51.

Current meter measurements have been made to check the calculated flows with very satisfactory results.

October 20-21, 1898, at Suspension Bridge, two miles below Little Falls. W. D. Lockwood, hydrographer.

	Second-feet.
Total flow by current meter	1,758
Computed flow (mean of two days)	1,733

May 1, 1900, at Suspension Bridge. R. E. Horton, hydrographer.

	Second-feet.
Total flow by current meter	4,733
Computed flow over dam	4,060
Computed diversion to Gilbert's mill	183
Computed diversion to paper mill	556
Total computed flow	4,799

May 23, 1900, at Astoronga bridge, Little Falls. R. E. Horton, hydrographer.

	Second-feet.
Total flow by current meter	1,567
Computed flow over dam	950
Computed diversion to Gilbert's mill	176
Computed diversion to paper mill	405
Total computed flow	1,531

Diversion to paper mill September 19, 1900.

Metered flow in headrace	302
Computed flow through turbines, etc	288

April 9, 1901, at Suspension Bridge. R. E. Horton, hydrographer.

	Second-feet.
Total flow by current meter	10,095
Estimated flow at Little Falls	9,880

There are three dams at Little Falls. The lower two are used for water power development. The upper one is a State dam, diverting water for the supply of Erie canal. The gauge record as kept at the lower dam shows the amount of water flowing downstream from Little Falls, but does not include diversion at the State dam above the gauging station, and hence does not represent the total yield or inflow from the tributary drainage area of 1,306 square miles.

Current meter measurements have been made in the feeder channel below the State dam as follows:

1900.	Measured diversion, second-feet.
May 23	143
September 19	179

Mean Daily Flow in Second-feet of Mohawk River at Little Falls, Herkimer County, N. Y., Lower Dam.

[Drainage area, 1.306 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	......	......	......	......	......	......	......	......	......	1,121	2.261	1,499
2	......	......	......	......	......	......	......	......	......	*916	1,880	1,547
3	......	......	......	......	......	......	......	......	......	849	1,790	1.451
4	......	......	......	......	......	......	......	......	......	895	1,560	*1,173
5	......	......	......	......	......	......	......	......	......	2,083	1,345	1,553
6	......	......	......	......	......	......	......	......	......	1,627	*1,501	1.763
7	......	......	......	......	......	......	......	......	......	1,558	1,946	1,639
8	......	......	......	......	......	......	......	......	......	1.179	2,040	1,269
9	......	......	......	......	......	......	......	......	......	*916	1.700	969
10	......	......	......	......	......	......	......	......	......	900	4,420	1,462
11	......	......	......	......	......	......	......	......	......	867	9,433	*1,508
12	......	......	......	......	......	......	......	......	......	915	7.925	1,709
13	......	......	......	......	......	......	......	......	......	1,028	*6,728	1,409
14	......	......	......	......	......	......	......	......	......	1,040	5,245	1,259
15	......	......	......	......	......	......	......	......	......	5,490	3,520	1.309
16	......	......	......	......	......	......	......	......	......	*5.026	2,891	1.259
17	......	......	......	......	......	......	......	......	......	3,081	2,370	1,434
18	......	......	......	......	......	......	......	......	......	2,265	2,220	*1.173
19	......	......	......	......	......	......	......	......	......	1,699	2,399	1.499
20	......	......	......	......	......	......	......	......	......	1.745	*2,878	1 499
21	......	......	......	......	......	......	......	......	......	1,722	2,771	1,834
22	......	......	......	......	......	......	......	......	......	2,646	2,361	2 909
23	......	......	......	......	......	......	......	......	1,125	*4,096	2,794	4.734
24	......	......	......	......	......	......	......	......	3,484	4,339	2,694	5,279
25	......	......	......	......	......	......	......	......	*4,093	3,240	2,538	*4,708
26	......	......	......	......	......	......	......	......	2,718	2.574	1.950	3,759
27	......	......	......	......	......	......	......	......	2.445	6,290	*1.473	2.209
28	......	......	......	......	......	......	......	......	2,220	6.188	1,137	1.899
29	......	......	......	......	......	......	......	......	1,615	5,121	1,412	1,499
30	......	......	......	......	......	......	......	......	1,320	*3,246	1,562	1,929
31	......	......	......	......	......	......	......	......	......	2,628	......	3,979
Mean.	......	......	......	......	......	......	......	......	2,378	2.493	2.891	2,036
1899.												
1	*2,854	941	3,258	3,041	6,360	1,597	569	506	278	*704	2,829	2,096
2	1,796	906	3,154	*2,519	6,708	1,610	*493	506	271	651	6.600	1,709
3	1,846	861	2,304	2,329	5,619	1,321	359	135	*30	651	4,738	*1,962
4	1.936	884	2.298	2,536	3,925	*1,075	424	136	396	491	3,081	2,175
5	6,821	*646	*3,408	2.387	2,905	1,466	490	166	545	534	*3,262	2,097
6	7,440	1,063	5,544	4.297	2,339	1,216	663	*000	382	399	2,847	1 668
7	5,886	983	5,544	4,637	*1,560	1,016	627	133	272	240	1,908	1,468
8	*4 269	983	5,154	7,212	1,801	1,062	651	131	275	*160	1,718	1,588
9	4,377	846	4,534	*6,759	1,571	962	*1,660	131	211	357	1,628	1,630
10	2,529	803	3,054	7,079	1,470	764	2,593	130	*7	297	1,451	*1,016
11	1,467	871	2,572	6.729	1,469	*1.176	1,800	316	273	274	717	2,779
12	1,378	*789	*3,967	7,979	1,846	660	1,320	383	270	305	*1,112	6,704
13	1,298	983	6,614	9,644	2.273	660	1,222	*000	270	274	1,526	10,996
14	1,992	903	6,529	12.484	*1.930	685	941	329	211	258	1,448	8,435
15	*4,104	1,222	6,304	12,502	2,212	960	884	352	230	*196	1,150	7,367
16	4,848	1,333	6.354	*12,649	1,746	1,860	*643	351	184	354	1,069	3,500
17	4,703	748	2,129	11,339	1,896	1,800	1,315	244	*55	339	1,120	*1,326
18	4,279	1,326	2,254	10,716	2,492	*965	1,211	251	278	344	1,037	1,692
19	1,509	*669	*3,195	10,869	2,843	568	1,086	216	267	339	*984	4,812
20	1,608	1,248	3,658	11.638	3.742	1,010	1,008	*65	281	355	1,070	8,540
21	1.687	1,523	2,704	12,159	*3,650	1.105	767	158	220	331	1,120	7,216
22	*1,794	2,598	3,429	10,878	3.143	985	95	223	249	*142	1,145	5,822
23	1,885	4,506	3,494	*10,409	2,172	866	*363	235	129	350	1,066	5,147
24	1,859	4,001	3,694	10,920	1,696	745	496	203	*55	401	987	*1,753
25	2,284	3,664	3,824	9,870	1,470	*851	496	203	238	392	900	2,186
26	2,060	*1.456	*3,258	8,990	1.309	759	516	246	225	369	*829	1,877
27	1,813	2,376	2,829	9,180	1,290	634	496	*136	556	387	822	1,571
28	1,175	3,201	2.345	7,880	*1,680	585	510	348	920	314	969	1,641
29	*1,574	......	2,514	7,139	2,323	560	460	188	642	*1,398	969	1,390
30	1,154	......	3,029	*6,299	3,827	535	*50	219	723	2,293	886	1,049
31	1,126	......	3,029	......	2,903	......	697	277	......	1,882	......	*932
Mean.	2,753	1.510	3,757	8,102	2,651	1,014	803	223	298	509	1,699	3,360

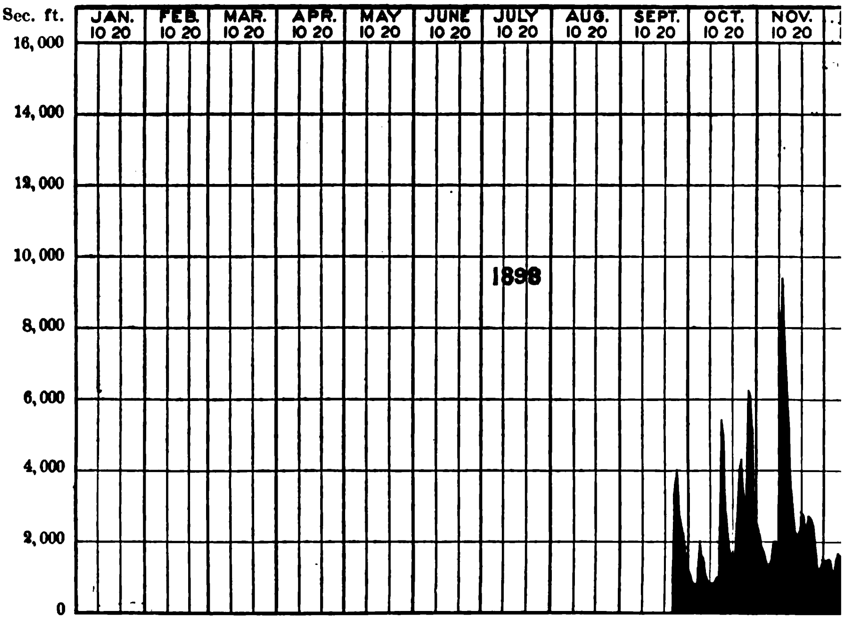
* Sunday.

***Mean Daily Flow in Second-feet of Mohawk River at Little Falls, Herkimer County, N. Y.* —(Continued).**

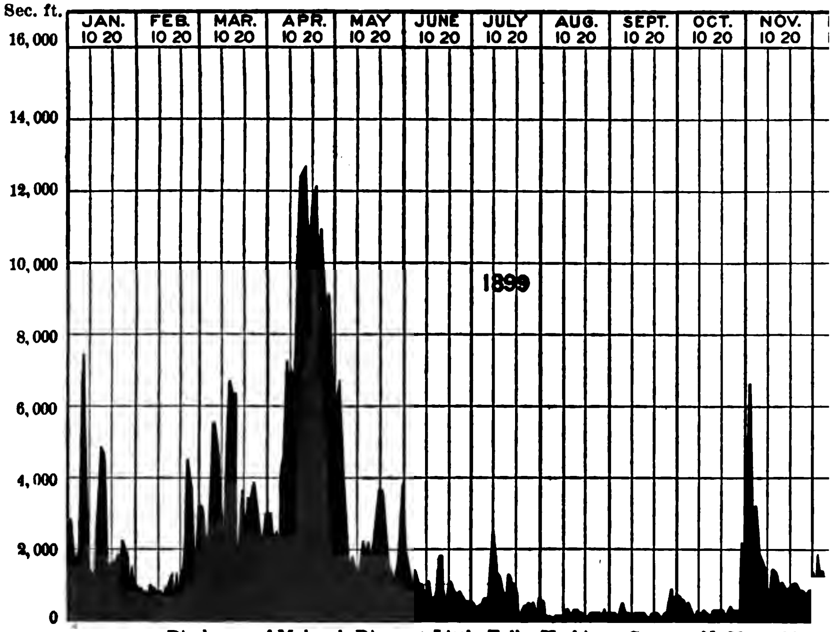
[Drainage area, 1,306 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	595	1,594	1,454	*5,785	4,673	645	*395	481	629	667	1,289	4,8
2	961	1,372	1,496	8,497	4,510	761	1,053	509	*545	849	1,289	*4,0
3	1,040	1,251	1,539	10,124	4,362	*1,119	1,804	515	455	881	1,197	3,2
4	1,040	*421	*1,001	9,162	4,014	1,346	311	339	503	499	*1,264	3,1
5	608	1,457	2,228	8,114	3,774	1,174	644	*93	503	491	885	6,31
6	578	1,682	2,013	7,936	*2,443	1,014	505	284	503	493	920	5,50
7	*180	1,594	1,967	9,998	1,658	760	788	274	629	*282	982	5,72
8	1,592	1,814	2,125	*10,065	1,698	1,214	*625	195	228	449	3,350	5,62
9	1,966	4,712	2,228	8,587	2,304	1,643	1,048	374	*326	665	5,335	*4,72
10	1,921	5,053	2,250	6,660	2,591	*1,283	876	452	294	747	3,837	2,57
11	1,772	*3,449	*1,889	5,053	2,595	1,134	754	153	326	747	*2,673	2,56
12	1,726	5,305	2,013	4,532	2,330	1,134	754	*181	200	499	1,901	2,38
13	1,576	10,192	1,818	4,304	*2,132	864	694	365	483	598	1,738	2,38
14	*1,731	11,128	1,875	4,202	1,462	864	666	2,041	515	*459	1,600	2,178
15	1,636	11,642	1,818	*4,607	1,859	896	*545	2,370	377	691	1,598	1,586
16	1,496	8,292	1,726	5,672	1,732	801	668	1,434	*461	1,231	1,368	*1,866
17	1,155	8,961	1,696	7,261	1,927	*555	724	1,084	515	1,032	1,207	1,630
18	1,455	*3,671	*1,380	11,128	1,778	702	826	874	713	983	*1,336	2,230
19	1,592	3,678	1,496	13,542	1,882	599	754	*745	501	881	1,998	1,825
20	4,302	2,334	1,967	15,242	*1,745	561	794	651	492	785	3,929	2,361
21	*7,291	1,968	3,345	15,032	1,732	650	1,170	494	599	*622	6,057	2,180
22	7,194	2,386	3,740	*11,275	1,637	579	*1,430	494	1,777	564	5,353	1,981
23	7,736	4,303	3,740	10,624	1,453	437	1,088	499	*1,380	643	4,515	*1,828
24	6,150	3,614	4,135	9,437	1,453	*72	696	475	953	1,114	3,417	3,509
25	4,740	*1,681	*3,720	8,497	1,165	474	1,424	527	1,034	2,137	*3,094	5,291
26	4,670	1,592	3,405	7,282	1,085	390	2,109	*795	915	1,884	12,083	5,177
27	4,242	1,456	3,030	6,921	*1,014	474	1,898	689	819	1,470	14,551	4,143
28	*1,528	1,541	3,030	5,490	751	474	1,384	657	914	*1,356	13,520	3,007
29	2,176	......	3,150	*4,559	751	674	*1,262	1,255	652	1,632	8,615	2,606
30	1,772	.....	4,233	4,672	723	740	874	959	* 668	1,322	4,734	*1,909
31	1,496	....	5,024	....	723	.. ...	696	721	......	1,192	......	2,159
Mean.	2,523	3,862	2,469	8,142	2,063	801	943	694	630	899	3,854	3,240
1901.												
1	2,193	1,210	1,195	4,818	3,838	4,230	1,335	1,886	*689	1,678	960	*878
2	1,611	1,170	1,162	4,025	4,127	*4,488	1,208	1,457	987	1,286	960	1,408
3	1,288	*862	*711	6,138	3,245	4,908	1,123	1,164	2,182	1,549	*778	2,448
4	1,078	1,130	1,038	7,400	2,998	5,045	686	*796	2,140	1,683	792	1,587
5	1,298	1,197	1,023	7,828	*2,200	4,151	980	919	1,877	1,321	791	1,682
6	*1,065	1,194	1,193	7,873	1,881	2,826	1,020	954	1,368	*1,148	750	1,192
7	1,524	1,149	1,153	*7,878	1,609	6,553	*1,433	999	1,079	1,369	697	1,220
8	1,457	1,076	1,072	9,109	1,371	6,996	1,839	1,165	*687	1,370	852	*961
9	1,783	997	1,159	10,065	1,369	*6,069	1,556	1,415	952	1,160	852	1,281
10	2,564	*832	*1,297	8,545	1,325	4,922	1,252	1,799	916	1,080	*925	3,899
11	2,564	1,161	1,634	6,430	1,563	3,172	1,122	*1,355	724	1,120	954	5,247
12	2,453	1,277	2,064	6,555	*5,118	2,489	1,294	2,075	895	1,197	1,292	5,171
13	*2,223	1,227	2,386	6,097	5,902	1,900	1,202	1,634	1,198	*1,029	5,183	4,920
14	2,190	1,187	2,734	*6,348	4,443	1,576	*962	1,235	1,666	1,396	4,802	6,174
15	2,145	1,227	2,175	6,691	2,944	1,655	1,044	1,290	*1,341	3,731	3,192	*20,158
16	2,083	1,200	2,417	6,905	2,358	*1,149	1,004	1,328	1,845	2,719	2,237	23,500
17	2,251	*950	*1,971	6,732	2,039	1,205	1,084	1,205	1,803	2,010	*1,881	9,682
18	2,253	1,332	2,461	6,408	2,553	1,295	1,122	*1,024	1,582	2,121	2,000	5,857
19	1,892	1,227	3,421	6,823	*3,655	1,208	1,165	1,002	1,453	2,276	1,951	4,086
20	*1,210	1,187	3,391	6,272	3,197	1,340	1,336	1,042	1,333	*1,265	1,799	2,506
21	1,284	1,188	6,229	* 5,570	2,750	1,572	*850	1,038	1,067	1,694	1,753	1,548
22	1,943	1,188	6,545	10,153	2,406	4,851	868	1,035	*880	1,511	1,662	*976
23	1,938	1,079	8,570	11,133	3,589	*6,428	907	1,037	923	1,202	1,572	1,612
24	1,799	*901	*7,635	10,002	3,333	6,112	667	1,037	1,040	1,332	*1,405	1,748
25	1,799	1,041	8,300	8,633	2,453	4,545	643	*858	998	1,116	1,768	2,040
26	1,615	1,074	12,979	7,786	*954	2,218	533	1,040	670	1,116	1,554	1,655
27	*1,115	1,034	19,254	6,023	1,889	1,575	642	1,039	698	*943	1,412	1,564
28	1,384	1,184	15,316	*4,051	2,308	1,651	*428	922	533	1,091	1,028	1,520
29	1,384	......	10,297	4,412	3,051	1,420	956	826	*705	1,091	1,114	*1,552
30	1,301	......	6,243	4,139	4,234	*1,149	1,731	826	889	1,009	1,073	2,529
31	1,301	......	5,759	....	4,388	....	2,862	775	......	1,009	......	2,476
Mean.	1,741	1,125	4,574	7,061	2,874	3,290	1,124	1,167	1,171	1,472	1,600	3,970

*Sunday.



Discharge of Mohawk River at Little Falls, Herkimer County, N. Y., 1898.

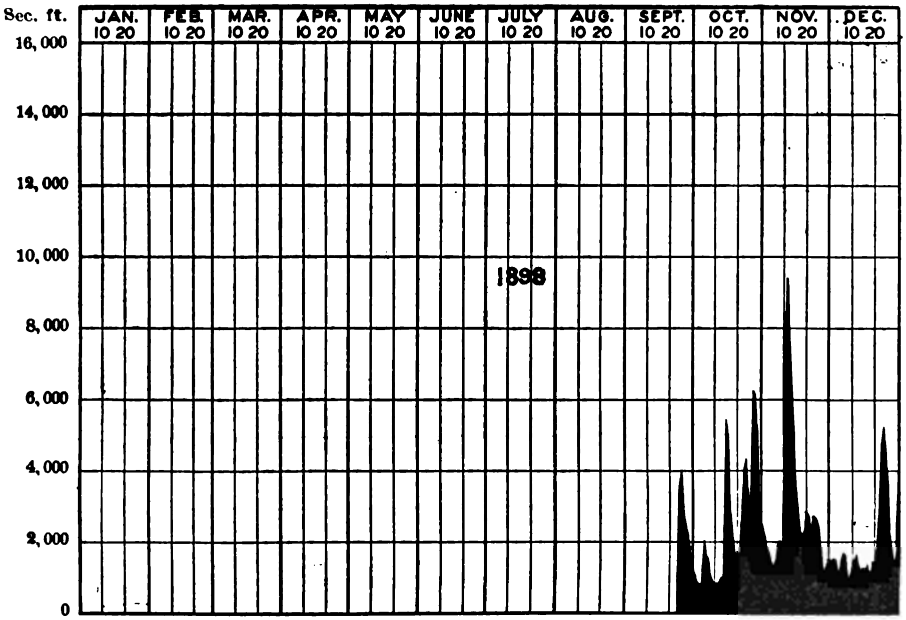


Discharge of Mohawk River at Little Falls, Herkimer County, N. Y., 1899.

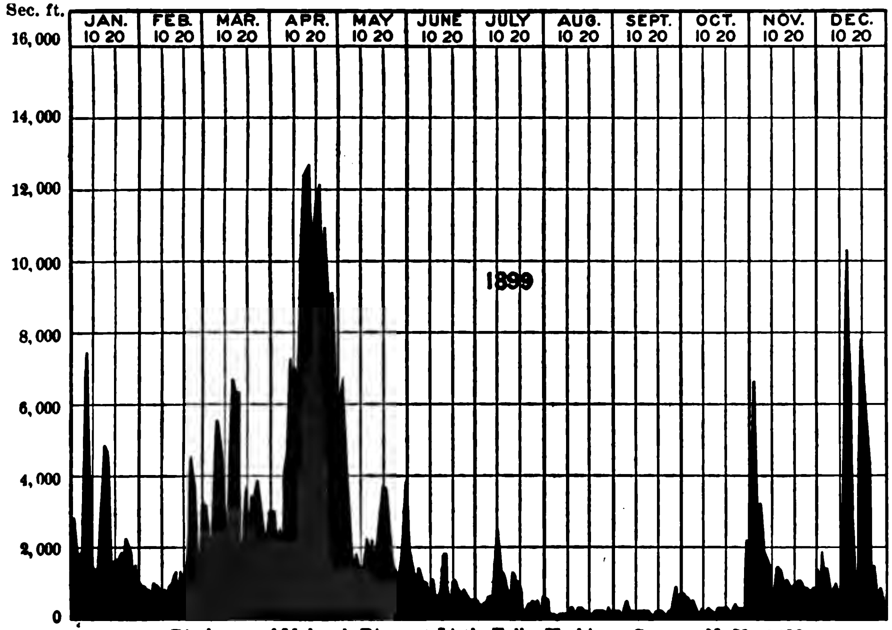
Mean Daily Flow in Second-feet of Mohawk River at Little Falls, Herkimer County, N. Y.
—(Continued).
[Drainage area, 1,306 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	595	1,594	1,454	*5,785	4,673	645	*395	481	629	667	1,289	4,845
2	961	1,372	1,496	8,497	4,510	761	1,053	509	*545	849	1,289	*4,027
3	1,040	1,251	1,539	10,124	4,362	*1,119	1,804	515	455	881	1,197	3,200
4	1,040	*421	*1,001	9,162	4,014	1,346	311	339	503	490	*1,264	3,109
5	608	1,457	2,228	8,114	3,774	1,174	644	*93	503	491	885	6,316
6	578	1,682	2,013	7,936	*2,443	1,014	505	284	503	493	920	5,504
7	*180	1,594	1,967	9,998	1,658	760	788	274	629	*282	982	5,727
8	1,592	1,814	2,125	*10,065	1,698	1,214	*625	195	228	449	3,350	5,620
9	1,966	4,712	2,228	8,587	2,304	1,643	1,048	374	*326	665	5,335	*4,725
10	1,921	5,053	2,250	6,660	2,591	*1,283	876	452	294	747	3,837	2,579
11	1,772	*3,449	*1,889	5,053	2,595	1,134	754	153	326	747	*2,673	2,562
12	1,726	5,305	2,013	4,532	2,330	1,134	754	*181	200	499	1,901	2,388
13	1,576	10,192	1,818	4,304	*2,132	864	694	365	483	598	1,738	2,388
14	*1,731	11,128	1,875	4,202	1,462	864	666	2,041	515	*459	1,600	2,178
15	1,636	11,642	1,818	*4,607	1,859	896	*545	2,370	377	691	1,598	1,586
16	1,496	8,292	1,726	5,672	1,732	801	668	1,434	*461	1,231	1,368	*1,866
17	1,455	8,961	1,696	7,261	1,927	*555	724	1,084	515	1,032	1,207	1,630
18	1,455	*3,671	*1,380	11,128	1,778	702	826	874	713	983	*1,336	2,230
19	1,592	3,678	1,496	13,542	1,882	599	754	*745	501	881	1,998	1,825
20	4,302	2,334	1,967	15,242	*1,745	561	794	651	492	785	3,929	2,361
21	*7,291	1,968	3,345	15,032	1,732	650	1,170	494	599	*622	6,057	2,180
22	7,194	2,386	3,740	*11,275	1,637	579	*1,430	494	1,777	564	5,353	1,981
23	7,736	4,303	3,740	10,624	1,453	437	1,088	499	*1,380	643	4,515	*1,828
24	6,150	3,614	4,135	9,437	1,453	*72	696	475	953	1,114	3,417	3,509
25	4,740	*1,681	*3,720	8,497	1,165	474	1,424	527	1,034	2,137	*3,094	5,291
26	4,670	1,592	3,405	7,282	1,085	390	2,109	*795	915	1,884	12,083	5,177
27	4,242	1,456	3,030	6,921	*1,014	474	1,898	689	819	1,470	14,551	4,143
28	*1,528	1,541	3,030	5,490	751	474	1,384	657	914	*1,356	13,520	3,007
29	2,176	......	3,150	*4,559	751	674	*1,262	1,255	652	1,632	8,615	2,606
30	1,772	......	4,233	4,672	723	740	874	959	* 668	1,322	4,734	*1,909
31	1,496	......	5,024	....	723	.....	696	721	......	1,192	......	2,159
Mean.	2,523	3,862	2,469	8,142	2,063	801	943	694	630	899	3,854	3,240
1901.												
1	2,193	1,210	1,195	4,818	3,838	4,230	1,335	1,886	*689	1,678	960	*878
2	1,611	1,170	1,162	4,025	4,127	*4,488	1,208	1,457	987	1,286	960	1,408
3	1,288	*862	*711	6,138	3,245	4,908	1,123	1,164	2,182	1,549	*778	2,448
4	1,078	1,130	1,038	7,400	2,998	5,045	686	*796	2,140	1,683	792	1,587
5	1,298	1,197	1,023	7,828	*2,200	4,151	980	919	1,877	1,321	791	1,682
6	*1,065	1,194	1,193	7,873	1,881	2,826	1,020	954	1,368	*1,148	750	1,192
7	1,524	1,149	1,153	*7,878	1,609	6,553	*1,433	999	1,079	1,369	697	1,220
8	1,457	1,076	1,072	9,109	1,371	6,996	1,839	1,165	*687	1,370	852	*961
9	1,783	997	1,159	10,065	1,369	*6,069	1,556	1,415	952	1,160	852	1,281
10	2,564	*832	*1,297	8,545	1,325	4,922	1,252	1,799	916	1,080	*925	3,899
11	2,564	1,161	1,634	6,430	1,563	3,172	1,122	*1,355	724	1,120	954	5,247
12	2,453	1,277	2,064	6,555	*5,118	2,489	1,294	2,075	895	1,197	1,292	5,171
13	*2,223	1,227	2,386	6,097	5,902	1,900	1,202	1,634	1,198	*1,029	5,183	4,920
14	2,190	1,187	2,734	*6,348	4,443	1,576	*962	1,235	1,666	1,396	4,802	6,174
15	2,145	1,227	2,175	6,691	2,944	1,655	1,044	1,290	*1,341	3,731	3,192	*20,158
16	2,083	1,200	2,417	6,905	2,358	*1,149	1,004	1,328	1,845	2,719	2,237	23,500
17	2,251	*950	*1,971	6,732	2,039	1,205	1,084	1,205	1,803	2,010	*1,881	9,682
18	2,253	1,332	2,461	6,408	2,553	1,295	1,122	*1,024	1,582	2,121	2,000	5,857
19	1,892	1,227	3,421	6,823	*3,655	1,208	1,165	1,002	1,453	2,276	1,951	4,086
20	*1,210	1,187	3,391	6,272	3,197	1,340	1,336	1,042	1,333	*1,265	1,799	2,506
21	1,284	1,188	6,229	* 5,570	2,750	1,572	*850	1,038	1,067	1,694	1,753	1,548
22	1,943	1,188	6,545	10,153	2,406	4,851	868	1,035	*880	1,511	1,662	*976
23	1,938	1,079	8,570	11,133	3,589	*6,428	907	1,037	923	1,202	1,572	1,612
24	1,799	*901	*7,635	10,002	3,333	6,112	667	1,037	1,040	1,332	*1,405	1,748
25	1,799	1,041	8,300	8,633	2,453	4,545	643	*858	998	1,116	1,768	2,040
26	1,615	1,074	12,979	7,786	*954	2,218	533	1,040	670	1,116	1,554	1,655
27	*1,115	1,034	19,254	6,023	1,889	1,575	642	1,039	698	*943	1,412	1,564
28	1,384	1,184	15,316	*4,051	2,308	1,651	*428	922	533	1,091	1,028	1,520
29	1,384	......	10,297	4,412	3,051	1,420	956	826	*705	1,091	1,114	*1,552
30	1,301	......	6,243	4,139	4,234	*1,149	1,731	826	889	1,009	1,073	2,529
31	1,301	......	5,759	....	4,388	.....	2,862	775	......	1,009	......	2,476
Mean.	1,741	1,125	4,574	7,061	2,874	3,290	1,124	1,167	1,171	1,472	1,600	3,970

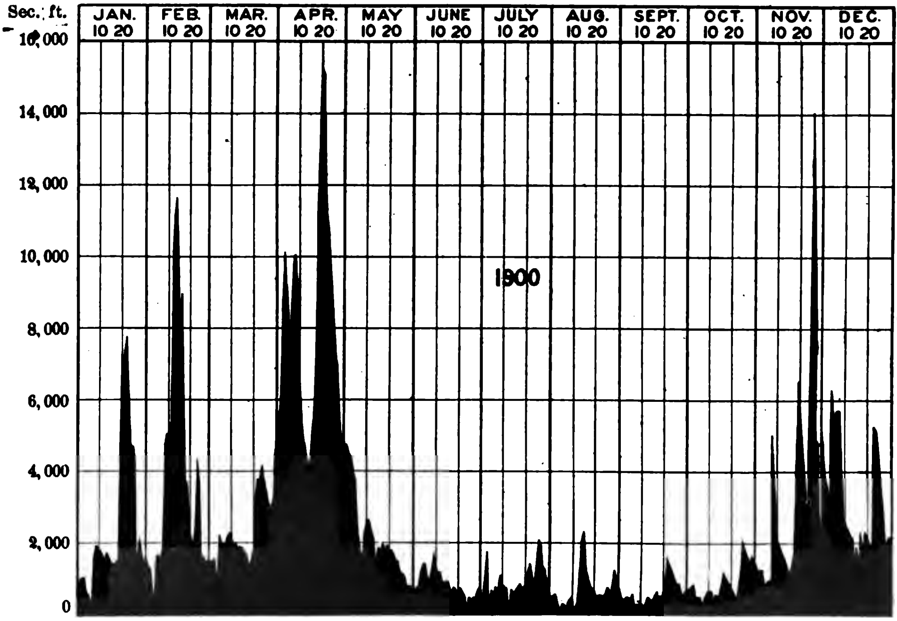
*Sunday.



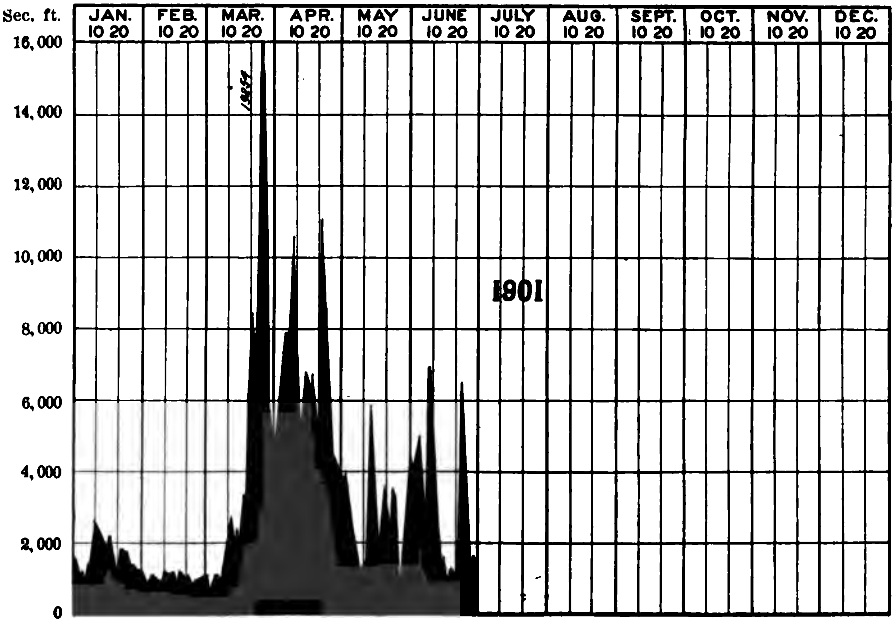
Discharge of Mohawk River at Little Falls, Herkimer County, N. Y., 1898.



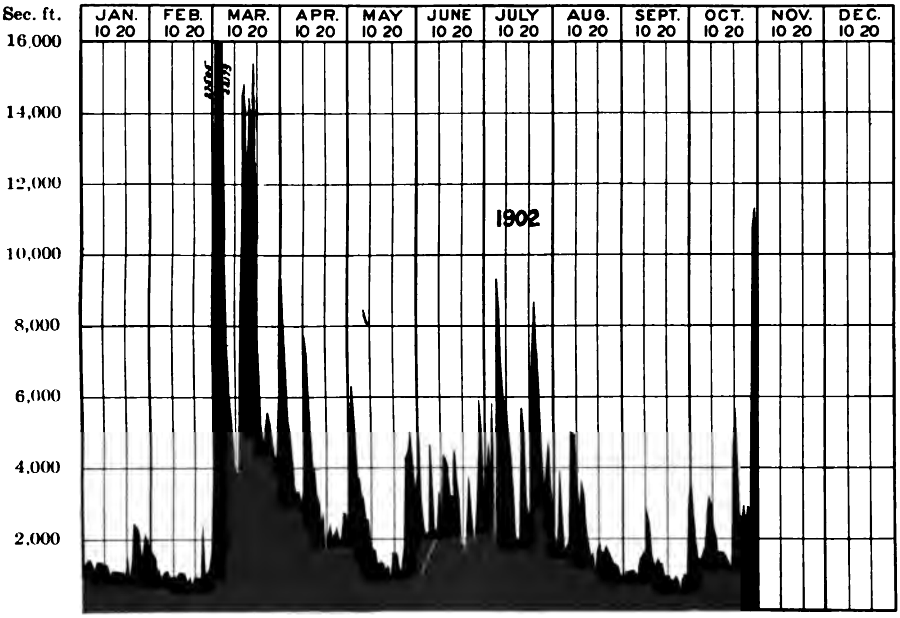
Discharge of Mohawk River at Little Falls, Herkimer County, N. Y., 1899.



Discharge of Mohawk River at Little Falls, Herkimer County, N. Y., 1900.



Discharge of Mohawk River at Little Falls, Herkimer County, N Y., 1901.



Discharge of Mohawk River at Little Falls, Herkimer County, N. Y., 1902.

Mean Daily Flow in Second-feet of Mohawk River at Little Falls, Herkimer County, N. Y.
—(Concluded.)

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1.....	1,332	1,519	13,024	6,791	6,306	*3,163	4,725	1,777	1,084	2,587	4,122	2,399
2.....	1,373	*1,107	*27,505	5,334	4,506	2,297	4,889	3,863	1,069	1,806	*2,829	1,178
3.....	1,410	1,163	22,173	5,099	3,752	2,141	5,821	*2,641	1,110	1,437	2,414	2,693
4.....	1,296	889	15,793	4,268	*3,650	2,176	1,232	1,875	1,110	1,447	2,297	3,436
5.....	*1,103	1,039	10,117	3,610	3,201	4,646	9,320	1,631	1,026	*1,563	2,141	5,952
6.....	1,368	1,119	7,680	*3,287	3,139	3,141	*8,486	2,077	956	1,760	2,028	2,299
7.....	1,369	1,119	5,951	3,310	2,528	2,162	6,800	5,001	*1,454	2,255	1,737	*1,957
8.....	1,369	924	4,989	3,003	2,584	*2,283	6,040	4,931	1,568	3,205	2,599	1,839
9.....	1,326	*939	*4,087	3,318	1,938	3,305	5,262	4,920	1,649	2,997	*1,856	1,646
10.....	1,286	956	3,850	7,759	1,710	2,456	5,088	*3,403	2,761	2,247	1,957	1,536
11.....	1,256	956	3,847	7,135	*1,660	4,351	4,272	2,478	2,466	2,113	1,737	1,762
12.....	*963	1,039	8,669	5,145	1,223	4,263	3,548	3,644	1,601	*1,623	2,245	1,813
13.....	1,115	1,039	14,508	*3,870	1,340	4,057	*2,082	3,179	1,348	1,613	3,310	1,616
14.....	1,115	1,039	14,866	4,002	1,383	3,273	1,878	2,230	*1,141	1,613	3,577	*1,635
15.....	1,155	1,018	11,881	3,256	1,210	*3,152	2,012	1,779	1,435	1,567	2,715	1,877
16.....	1,160	*770	*14,465	3,003	1,167	4,473	5,718	1,510	1,250	1,472	*2,261	2,004
17.....	1,120	956	13,886	2,287	1,215	3,426	4,498	*1,642	1,290	1,305	1,998	5,565
18.....	1,093	699	15,440	2,692	*857	3,119	2,878	1,065	922	1,191	2,519	5,797
19.....	*936	956	9,744	1,437	1,603	1,783	2,602	1,778	951	*4,628	2,028	5,958
20.....	1,551	956	7,177	*1,988	1,603	1,830	*4,740	1,870	954	5,631	1,930	5,177
21.....	952	921	5,176	2,404	1,559	1,649	7,299	1,616	*828	4,070	1,838	*4,817
22.....	1,155	893	4,684	2,015	1,112	*3,782	8,699	1,616	798	2,526	1,852	6,665
23.....	2,458	*2,404	*5,150	2,128	1,111	2,959	7,306	1,844	943	2,517	*2,214	7,890
24.....	2,341	1,039	5,572	2,336	1,691	2,287	6,114	*1,664	812	2,933	2,589	6,082
25.....	2,237	1,039	5,255	2,014	*4,322	1,831	4,261	1,480	481	2,316	2,354	5,301
26.....	*1,436	1,211	4,632	1,933	4,494	3,291	3,158	1,328	871	*2,951	1,892	4,576
27.....	1,729	1,689	4,352	*2,733	5,020	6,027	*4,073	1,197	996	2,558	3,315	3,275
28.....	2,133	3,449	4,195	2,773	4,132	4,977	4,701	1,284	*924	10,758	4,650	*2,825
29.....	1,971	......	5,849	2,355	3,309	*3,326	3,429	1,018	3,249	11,311	3,748	2,574
30.....	1,786	......	*9,329	4,093	3,718	3,503	2,462	986	3,511	8,373	*2,476	2,295
31.....	1,637	......	9,336	......	4,812	......	2,086	*	......	7,235	......	2,464
Mean.	14,332	11,731	94,575	35,126	26,405	31,709	49,842	22,449	13,519	32,838	2,508	3,448

*Sunday.

Mean Monthly Run-off of Mohawk River at Little Falls, Herkimer Co., N. Y.
[Drainage area, 1,306 square miles.]
SECOND-FEET.

MONTH.	1898.	1899.	1900.	1901.	1902.
January....................	......	2,753	5,523	1,741	1,433
February....................	......	1,510	3,862	1,125	1,173
March....................	......	3,757	2,469	4,574	9 457
April....................	......	8,102	8,142	7,061	3,513
May....................	......	2,651	2,063	2,874	2,641
June....................	......	1,014	801	3,290	3,171
July....................	......	803	943	1,124	4,984
August....................	......	223	694	1,167	2,202
September....................	2,378	298	630	1,171	1,350
October....................	2,493	509	899	1,472	3,284
November....................	2,891	1,699	3,854	1,600	2,508
December....................	2,036	3,360	3,240	3,970	3,448

Mean Monthly Run-off of Mohawk River at Little Falls, Herkimer County, N. Y.—(Concluded).

SECOND-FEET PER SQUARE MILE.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	2.11	4.23	1.33	1.10
February	......	1.15	2.96	0.86	0.90
March	......	2.88	1.89	3.50	7.25
April	......	6.20	6.23	5.41	2.69
May	......	2.03	1.58	2.20	2.02
June	......	0.78	0.61	2.52	2.43
July	......	0.61	0.72	0.86	3.82
August	......	0.17	0.53	0.89	1.68
September	1.84	0.23	0.48	0.90	1.03
October	1.91	0.39	0.69	1.13	2.51
November	2.21	1.30	2.95	1.23	1.92
December	1.56	2.57	2.48	3.02	2.64

INCHES ON DRAINAGE AREA.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	2.35	4.86	1.53	1.27
February	......	1.19	3.08	0.89	0.94
March	......	3.32	2.18	4.02	8.34
April	......	6.92	6.95	6.06	3.00
May	......	2.34	1.82	2.53	2.33
June	......	0.87	0.68	2.82	2.71
July	......	0.70	0.83	0.99	4.40
August	......	0.19	0.61	1.02	1.94
September	2.05	0.25	0.53	1.01	1.15
October	2.20	0.45	0.79	1.30	2.89
November	2.46	1.45	3.30	1.38	2.21
December	1.74	2.69	2.85	3.47	2.95

Adding these amounts to the mean daily flow at Gilbert's Dam, for the same dates, we obtain the following:

DATE.	Total inflow at Little Falls, second-feet.	Outflow in main channel, second-feet.
May 23, 1900	1,596	1,453
September 19, 1900	693	514

While the record has been kept at Little Falls the following extreme freshets have occurred:

DATE.	Discharge, second-feet.	Second-feet per square mile.
April 15, 1899	13,000	10.0
April 20, 1900	15,240	11.7
November 27, 1900	15,669	12.0
March 27, 1901	19,538	14.9
December 16, 1901	26,280	20.1
March 1, 1902	27,000	20.7

The highest recorded previous flood occurred in February, 1891, when the estimated discharge was 26,260 second-feet.

The most notable low-water period was August 3 to August 10, inclusive, 1899, the mean flow for nine days being but 120 second-feet, or 0.07 second-foot per square mile. This was due to the almost complete diversion of the run-off above to supply Erie Canal.

MOHAWK RIVER AT ROCKY RIFT DAM, HERKIMER COUNTY, N. Y.

Five Mile, or Rocky Rift, Dam is a State dam used during the navigation season to divert water to Erie Canal. When the canal is closed the entire flow of Mohawk River passes over this dam. During the summer flashboards are maintained on the crest. These are carried off in the winter by ice and high water. The crest of the dam is straight and nearly level. The discharge during the high-water season of the winter of 1901 has been calculated from gauge readings taken in connection with slope gaugings of Mohawk River, described elsewhere. The flow over the crest has been calculated from experiments at Cornell University on a model dam of similar cross-section. The maximum discharge recorded was on March 21, 1901, and is estimated to have been 23,150 second-feet, or 17.2 second-feet per square mile from the tributary drainage area of 1,337 square miles.

Mean Daily Flow in Second-feet of Mohawk River at Rocky Rift Dam, Herkimer Co., N. Y.
[Drainage area, 1,351 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
1901.												
1	....	....	760	4,460	....	....	....	....	....	....	....	....
2	....	....	760	4,750	....	....	....	....	....	....	....	....
3	....	....	620	6,730	....	....	....	....	....	....	....	....
4	....	....	415	6,730	....	....	....	....	....	....	....	....
5	....	....	415	9,940	....	....	....	....	....	....	....	....
6	....	....	415	7,740	....	....	....	....	....	....	....	....
7	....	....	620	8,420	....	....	....	....	....	....	....	....
8	....	....	900	8,780	....	....	....	....	....	....	....	....
9	....	....	900	9,160	....	....	....	....	....	....	....	....
10	....	....	1,060	8,090	....	....	....	....	....	....	....	....
11	....	....	1,840	7,240	....	....	....	....	....	....	....	....
12	....	....	1,840	7,580	....	....	....	....	....	....	....	....
13	....	....	1,840	5,460	....	....	....	....	....	....	....	....
14	....	....	1,840	7,580	....	....	....	....	....	....	....	....
15	....	....	1,950	7,060	....	....	....	....	....	....	....	....
16	....	....	2,100	6,140	....	....	....	....	....	....	....	....
17	....	....	1,950	6,730	....	....	....	....	....	....	....	....
18	....	....	2,920	6,560	....	....	....	....	....	....	....	....
19	....	....	4,430	6,560	....	....	....	....	....	....	....	....
20	....	....	4,430	7,060	....	....	....	....	....	....	....	....
21	....	....	8,790	6,380	....	....	....	....	....	....	....	....
22	....	....	8,610	10,300	....	....	....	....	....	....	....	....
23	....	900	8,270	13,920	....	....	....	....	....	....	....	....
24	....	900	7,940	15,400	....	....	....	....	....	....	....	....
25	....	900	890	9,360	....	....	....	....	....	....	....	....
26	....	900	13,280	6,900	....	....	....	....	....	....	....	....
27	....	900	17,340	6,380	....	....	....	....	....	....	....	....
28	....	900	16,460	5,160	....	....	....	....	....	....	....	....
29	....	....	10,310	4,800	....	....	....	....	....	....	....	....
30	....	....	7,580	4,460	....	....	....	....	....	....	....	....
31	....	....	5,170	....	....	....	....	....	....	....	....	....
Mean	....	900	4,537	7,528	....	....	....	....	....	....	....	....

Current meter discharge measurements in the feeder channel below Rocky Rift Dam give the following results:

DATE.	Flow in feeder, second-feet.
November 3, 1900	236
May 3, 1901	203

CAYADUTTA CREEK, NEAR JOHNSTOWN, FULTON COUNTY, N. Y.

Cayadutta Creek rises in Fulton County and flows into Mohawk River near Fonda. The dam of the Johnstown Electric Light and Power Company, one mile below Johnstown, where the record has been kept, is of framed timber, 33 feet in height, on a rock foundation. The impounded water is carried from above the dam to the power-house through a 5-foot circular wooden flume.

The profile of the crest of the dam is somewhat irregular, and, for facility of computation, it has been divided into four parts, the crest line of each section being assumed horizontal. Since the establishment of the station, standard sharp-crested gauging weirs have been erected for the company by Professor O. H. Landreth. One of these weirs has been placed across the main stream above the head of slack water from the dam. A second weir has been placed in the tailrace below the power-house. During the summer the water does not ordinarily flow over the dam, which is practically water-tight, the entire flow being passed through the turbines. A series of gaugings at the tailrace weir has been made in order to determine the discharging capacity of the water wheels when running under different conditions, and calibration curves so obtained for the wheels have been used in calculating the later records.

Mean Daily Flow in Second-feet of Cayadutta Creek near Johnstown, Fulton Co., N. Y.
[Drainage area, 40 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	....	....	....	....	....	....	....	....	....	24	41	39
2	....	....	....	....	....	....	....	....	....	*10	36	48
3	....	....	....	....	....	....	....	....	....	22	38	46
4	....	....	....	....	....	....	....	....	....	25	32	*51
5	....	....	....	....	....	....	....	....	....	119	39	23
6	....	....	....	....	....	....	....	....	....	246	*12	51
7	....	....	....	....	....	....	....	....	....	67	32	50
8	....	....	....	....	....	....	....	....	....	55	35	39
9	....	....	....	....	....	....	....	....	....	*14	179	38
10	....	....	....	....	....	....	....	....	....	37	734	38
11	....	....	....	....	....	....	....	....	....	23	429	*25
12	....	....	....	....	....	....	....	....	....	27	110	46
13	....	....	....	....	....	....	....	....	....	33	*64	37
14	....	....	....	....	....	....	....	....	....	38	68	36
15	....	....	....	....	....	....	....	....	....	290	55	33
16	....	....	....	....	....	....	....	....	....	*117	49	32
17	....	....	....	....	....	....	....	....	....	68	57	34
18	....	....	....	....	....	....	....	....	....	47	57	*27
19	....	....	....	....	....	....	....	....	....	46	97	33
20	....	....	....	....	....	....	....	....	....	39	*67	35
21	....	....	....	....	....	....	....	....	....	47	67	45
22	....	....	....	....	....	....	....	....	....	55	50	58
23	....	....	....	....	....	....	....	....	....	*105	54	98
24	....	....	....	....	....	....	....	....	....	56	63	67
25	....	....	....	....	....	....	....	....	....	48	55	*60
26	....	....	....	....	....	....	....	....	....	36	42	75
27	....	....	....	....	....	....	....	....	....	58	*24	42
28	....	....	....	....	....	....	....	....	....	55	46	31
29	....	....	....	....	....	....	....	....	....	138	59	34
30	....	....	....	....	....	....	....	....	....	*13	42	50
31	....	....	....	....	....	....	....	....	....	41	.....	44
Mean	....	....	....	....	....	....	....	....	....	64	91	44

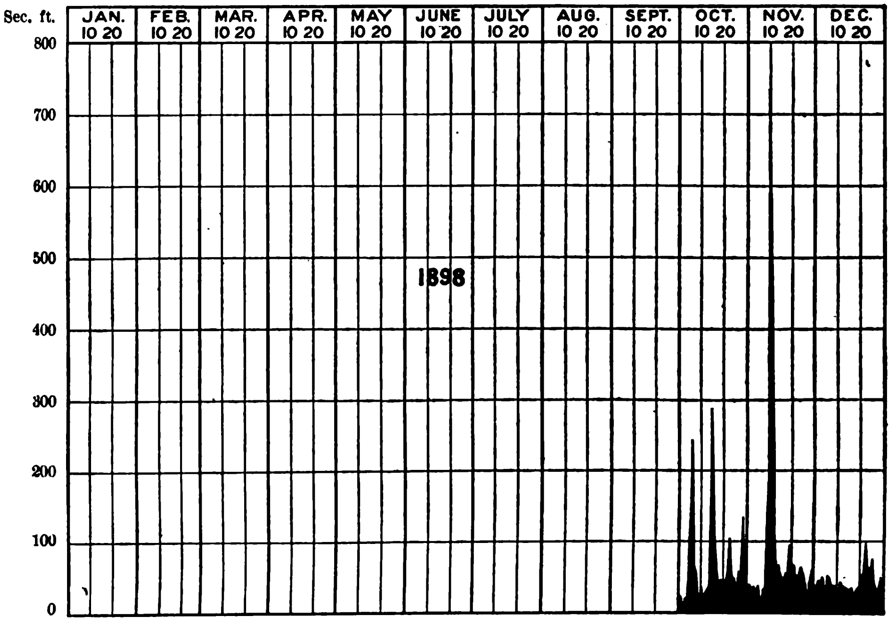
* Sunday.

Mean Daily Flow in Second-feet of Cayadutta Creek near Johnstown, Fulton Co., N. Y.—(Con.)

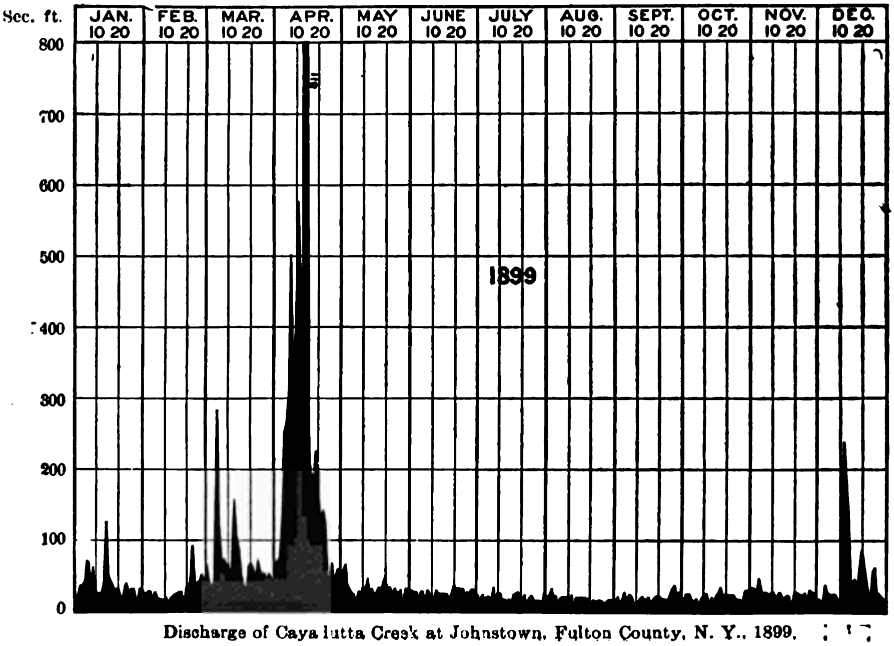
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1	*20	27	66	72	57	30	21	20	16	*12	33	19
2	39	25	48	*70	66	28	*15	22	20	24	31	.....
3	31	29	36	83	36	29	24	32	*12	24	28	*14
4	42	26	40	132	32	*17	17	22	19	25	48	37
5	71	*19	*111	252	28	29	20	21	28	17	*34	27
6	69	29	282	263	27	28	20	*11	16	15	26	23
7	40	23	122	313	*12	18	19	19	23	19	28	23
8	*64	19	71	503	29	30	34	20	22	*9	26	23
9	42	18	72	*320	26	21	*16	20	17	18	22	23
10	29	18	67	413	25	19	27	20	*7	20	27	*13
11	24	20	53	579	27	*18	25	17	16	24	26	27
12	27	*14	*123	415	47	30	18	23	19	23	*20	238
13	26	19	155	811	29	25	18	*8	20	13	28	207
14	43	21	105	751	*31	24	16	20	17	20	28	145
15	*125	24	84	802	25	25	18	20	19	*17	30	55
16	51	25	46	*218	28	25	*13	20	20	24	20	40
17	43	26	38	190	34	25	23	20	*11	26	21	*44
18	35	27	35	196	33	*17	25	20	19	33	20	36
19	31	*15	*66	225	43	25	26	19	20	21	*6	51
20	33	32	67	168	47	37	20	*9	21	.....	27	85
21	28	33	66	135	*34	32	19	15	20	.....	27	62
22	*16	55	50	142	34	33	23	16	17	*	26	42
23	35	91	74	*123	26	32	*8	14	19	.....	25	26
24	40	39	59	41	31	32	18	16	*14	.....	24	*19
25	27	40	52	65	26	*18	22	16	20	21	26	56
26	32	*43	*54	66	25	29	19	14	32	18	*14	60
27	32	53	48	44	30	26	16	*11	36	18	30	25
28	24	48	54	52	*15	30	17	15	26	19	28	24
29	*13	.....	48	60	32	30	17	16	27	*16	28	20
30	33	.....	46	*31	13	22	*14	16	26	30	15	19
31	33	.....	48	.....	28	.....	25	16	.....	30	.....	*11
Mean	39	31	74	251	31	26	20	18	20	21	26	49
1900.												
1	27	39	41	*250	38	36	*6	12	11	.....	.....	.....
2	27	29	42	292	25	22	14	22	*7	.....	.....	.....
3	25	22	44	339	25	*8	20	20	21	.....	.....	.....
4	20	*20	*23	212	25	30	6	18	17	.....	.....	.....
5	18	251	55	199	28	26	15	*7	17	.....	.....	.....
6	20	43	41	280	*24	25	15	20	17	.....	.....	.....
7	*24	42	50	293	30	23	15	20	17	.....	.....	.....
8	60	148	45	*155	25	24	*7	20	21	.....	.....	.....
9	39	235	45	102	81	33	31	22	*8	.....	.....	.....
10	43	76	49	78	63	*13	19	18	21	.....	.....	.....
11	37	*82	*39	77	30	29	18	14	20	.....	.....	.....
12	34	116	66	91	24	29	20	*4	6	.....	.....	.....
13	30	1,404	48	106	*19	16	23	27	7	.....	.....	.....
14	*14	89	40	78	23	24	18	28	18	.....	.....	.....
15	35	77	41	*91	26	29	*12	29	16	.....	.....	.....
16	37	59	39	133	23	22	19	34	*9	.....	.....	.....
17	29	46	41	200	24	*9	20	35	19	.....	.....	.....
18	40	*23	*19	314	29	24	18	33	21	.....	.....	.....
19	92	42	42	164	26	24	17	*10	19	.....	.....	.....
20	705	41	45	102	*22	24	14	18	21	.....	.....	.....
21	*306	39	52	76	25	22	19	21	21	.....	.....	.....
22	101	44	52	*116	24	21	*7	20	21	.....	.....	.....
23	83	107	111	92	19	17	15	21	*14	.....	.....	.....
24	55	87	82	80	22	*10	18	22	32	.....	.....	.....
25	71	*41	*52	71	23	17	17	22	32	.....	.....	.....
26	50	60	46	64	26	19	26	*7	21	.....	.....	.....
27	43	42	50	48	*19	14	25	20	21	.....	.....	.....
28	*23	39	49	46	22	17	26	19	23	.....	.....	.....
29	44	.....	106	*22	19	19	*13	20	23	.....	.....	.....
30	36	.....	165	25	20	18	13	20	*10	.....	.....	.....
31	31	.....	296	.....	22	.....	13	18	.....	.....	.....	.....
Mean	71	119	62	137	27	21	17	20	18	.....	.....	.....

* Sundays.

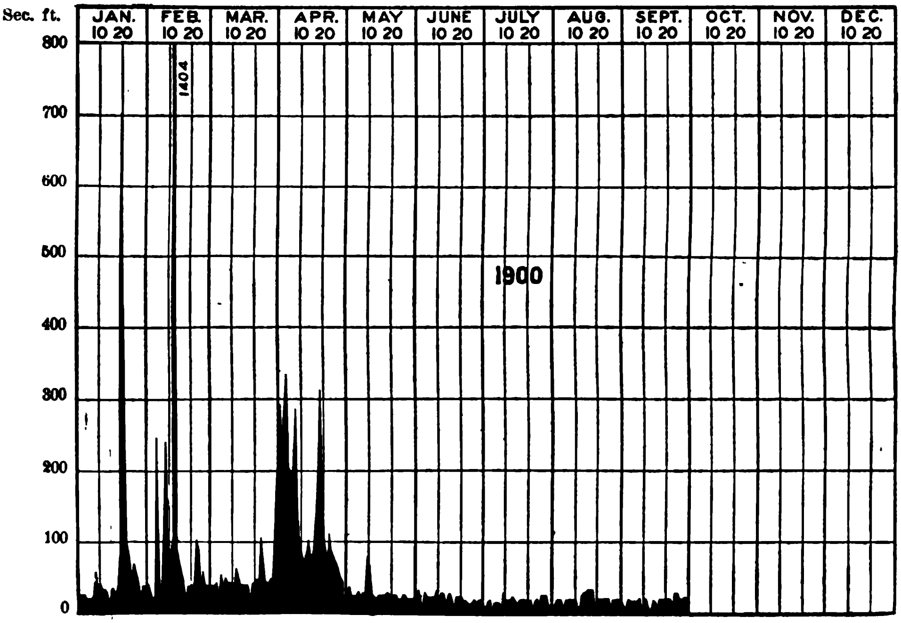
(See Water Supply and Irrigation Paper, U. S. G. S., No. 35 page 53.)



Discharge of Cayadutta Creek at Johnstown, Fulton County N. Y., 1898.



Discharge of Cayadutta Creek at Johnstown, Fulton County, N. Y., 1899.



Discharge of Cayadutta Creek at Johnstown, Fulton County, N. Y., 1900.

Dams are located along the stream at frequent intervals and the amount of flow, from one to another, during the dry season, is largely controlled by the run of the water wheels. The drainage area tributary to Cayadutta Creek, above the gauging station, is 40 square miles, and above its mouth 62 square miles.

Mean Monthly Run-off of Cayadutta Creek near Johnstown, Fulton County, N. Y.

[Drainage area, 40 square miles.]

MONTH.	SECOND-FEET.			SECOND-FEET PER SQUARE MILE.			INCHES ON DRAINAGE AREA.		
	1898.	1899.	1900.	1898.	1899.	1900.	1898.	1899.	1900.
January	......	39	71	......	0.97	1.77	......	1.12	2.04
February	......	31	119	......	0.77	2.97	......	0.80	3.09
March	......	74	62	......	1.85	1.55	......	2.13	1.78
April	......	251	137	......	6.27	3.50	......	7.00	3.90
May	......	31	27	......	0.77	0.67	......	0.89	0.77
June	......	26	21	......	0.65	0.52	......	0.72	0.58
July	......	20	17	......	0.50	0.42	......	0.57	0.48
August	......	18	20	......	0.45	0.50	......	0.52	0.57
September	......	20	18	......	0.50	0.45	......	0.56	0.50
October	64	21	......	1.60	0.52	......	1.84	0.60	......
November	91	26	......	2.27	0.65	......	2.53	0.72	......
December	44	49	......	1.10	1.22	......	1.27	1.40	......

SCHOHARIE CREEK AT FORT HUNTER DAM AND AQUEDUCT, MONTGOMERY COUNTY, N. Y.

Schoharie Creek finds its origin in the western slope of the Catskill Mountains. The lower stretches of the creek flow through a long, flat valley in a stream channel covered with riprap, over which the water finds its way in a thin sheet during the dry season.

The State dam at Fort Hunter is near the mouth of the stream, and high water from the Mohawk backs up to the toe of the dam. A record of the elevation of water surface in the pond above the dam has been made. A similar record of the elevation of the water surface below the dam shows the average difference or fall to be 5.25 feet. This quantity is nearly constant except when the water falls below the crest level above the dam or when the height of the down-stream side is affected by backwater. The dam is of timber, backed with gravel, and there are a number of leaks above the gravel line at an elevation of two feet below that of the crest. During the summer, diversion through the canal feeder keeps the water level below that of the dam crest, hence the leakage of the dam represents practically the total inflow from Schoharie Creek to the Mohawk during the low-water season. Current meter measurements of the leakage of the dam were made below the Erie Canal aqueduct at a point where the entire flow is concentrated in a narrow channel.

DATE.	Hydrographer.	Measured leakage, second-feet.
June 26, 1900	R. E. Horton	30
July 18, 1900	E. D. Walker	38
August 22, 1900	E. D. Walker	44

The leakage of the dam has been assumed constantly equal to 35 second-feet in computing the record. The Fort Hunter station was established September 24, 1898. The intention was to maintain a record of the water height above and below the head-gates at the entrance to the canal feeder, from which the effective head on the gate openings could be determined and the flow computed by the formula for submerged orifices. During the dry season the water falls below the lip of the gates and flows in an open channel, making this method inapplicable. In recomputing the record, the diversion to the canal feeder has been estimated from current meter measurements as follows:

DATE.	Hydrographer.	Measured flow in feeder, second-feet.
June 21, 1900	R. E. Horton	112
July 18, 1900	E. D. Walker	76
August 22, 1900	E. D. Walker	73

Inflow to the Erie Canal is controlled by gates at the lower end of the feeder channel, so that the flow in the feeder is not directly a function of the stage of the water. Owing to the uncertainty of the low water measurements, this station was abandoned July 31, 1900. It was again resumed October 1, 1900, and maintained during the winter of 1900 and 1901, in connection with the Barge Canal Survey. The record for the winter months of 1900 and 1901, when no diversion to the canal took place, is included in the accompanying tables.[a]

The tables given show the total outgo from the pond above the State dam. As pointed out, the greater portion of this flow during the navigation season goes into Erie Canal. During the winter the entire flow is tributary to Mohawk River. A rough meter measurement above Fort Hunter Dam, April 24, 1900, showed the discharge to be 5,573 second-feet.

The Erie Canal crosses Schoharie Creek between Fort Hunter Dam and Mohawk River. A gauging record was established at the aqueduct May 2, 1900, by Prof. Elton D. Walker. A current meter measurement of the flow through the archways of the canal aqueduct, made at that time, showed a discharge of 1,257 second-feet; gauge height, 2.26 feet. A similar measurement of the discharge at this point October 25, 1898, by W. D. Lockwood, gave a discharge of 1,015 second-feet. Owing to cross currents above the aqueduct, it was found impossible to secure reliable gaugings, and the station was abandoned October 13, 1900. The locations of the Fort Hunter and aqueduct gauging stations are shown on the Fonda sheet of the United States Geological Survey.

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[a] The tables of flow as computed from the earlier portion of the record, allowing 315 second feet for leakage, may be found in Water Supply and Irrigation Paper, No. 35, p. 55.

Daily Gauge Height of Schoharie Creek at Fort Hunter, Montgomery Co., N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	......	......	......	......	......	1.38	0.60	0.67	0.54	0.53	......	......
2	......	......	......	......	2.24	1.47	.62	.65	.53	.54	......	......
3	......	......	......	......	2.20	1.76	.58	.64	.54	.51	......	......
4	......	......	......	......	2.14	1.62	.60	.63	.53	.53	......	......
5	......	......	......	......	2.10	0.94	.60	.62	.54	.58	......	......
6	......	......	......	......	2.00	0.95	.57	.61	.54	.61	......	......
7	......	......	......	......	1.10	0.87	.56	.52	.53	.62	......	......
8	......	......	......	......	2.00	0.90	.50	.52	.54	.58	......	......
9	......	......	......	......	1.97	1.90	.43	.51	.64	.54	......	......
10	......	......	......	......	2.00	1.84	.52	.50	.64	.52	......	......
11	......	......	......	......	1.10	1.80	.60	.52	.65	.59	......	......
12	......	......	......	......	1.97	1.40	.63	.53	.65	.56	......	......
13	......	......	......	......	1.89	1.68	.64	.52	.65	.57	......	......
14	......	......	......	......	1.76	1.40	.60	.57	.64	......	......	......
15	......	......	......	......	1.70	1.13	.54	.54	.65	......	......	......
16	......	......	......	......	1.67	1.20	.53	.53	.64	......	......	......
17	......	......	......	......	1.58	0.82	.58	1.43	.65	......	......	......
18	......	......	......	......	1.52	.71	.56	1.32	.65	......	......	......
19	......	......	......	......	1.47	.82	.60	1.92	.65	......	......	......
20	......	......	......	......	1.98	.70	.61	0.97	.65	......	......	......
21	......	......	......	......	2.84	.72	.63	.78	.65	......	......	......
22	......	......	......	......	2.43	.70	.65	.71	.65	......	......	......
23	......	......	......	......	2.14	.67	.62	.68	.64	......	......	......
24	......	......	......	......	1.93	.60	.68	.64	.62	......	......	......
25	......	......	......	......	1.87	.60	.71	.63	.53	......	......	......
26	......	......	......	......	1.80	.60	.73	.54	.56	......	......	......
27	......	......	......	......	1.67	.60	.78	.53	.57	......	......	......
28	......	......	......	......	1.40	.62	.72	.54	.53	......	......	......
29	......	......	......	......	1.47	.61	.60	.53	.52	......	......	......
30	......	......	......	......	1.45	.60	.63	.53	.53	......	......	......
31	......	......	......	......	1.40	......	.64	.54	......	......	......	......

Mean Monthly Run-off of Schoharie Creek at Fort Hunter, Montgomery Co., N. Y.

MONTH.	SECOND-FEET.				SECOND-FEET PER SQUARE MILE.				INCHES ON DRAINAGE AREA.			
	1898.	1899.	1900.	1901.	1898.	1899.	1900.	1901.	1898.	1899.	1900.	1901.
January	.....	2,307	1,313	998	.....	2.44	1.38	1.06	.....	2.81	1.59	1.22
February	.....	1,944	.....	1,393	.....	2.05	.....	1.48	.....	2.13	.....	1.56
March	.....	3,792	3,137	4,348	.....	4.01	3.31	4.61	.....	4.62	3.81	5.30
April	.....	4,100	3,530	7,165	.....	4.33	3.73	7.59	.....	4.83	4.16	8.50
May	.....	579	561	.....	.....	0.61	0.59	.....	.....	0.70	0.68	.....
June	.....	226	219	.....	.....	0.24	0.23	.....	.....	0.26	0.25	.....
July	.....	187	115	.....	.....	0.20	0.12	.....	.....	0.23	0.14	.....
August	.....	142	.....	.....	.....	0.15	.....	.....	.....	0.17	.....	.....
September	129	916	.....	.....	0.14	0.97	.....	.....	0.15	1.08	.....	.....
October	1,142	1,603	.....	.....	1.21	1.69	.....	.....	1.36	1.95	.....	.....
November	2,148	875	.....	.....	2.27	0.92	.....	.....	2.53	1.02	.....	.....
December	1,573	.....	950	.....	1.66	.....	1.01	.....	1.91	.....	1.16	.....

Mean Daily Flow in Second-feet, Schoharie Creek, at Fort Hunter, Montgomery Co., N. Y.
[Drainage area, 947 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	......	......	......	......	......	......	......	......	......	161	1,617	1,139
2	......	......	......	......	......	......	......	......	......	161	1,717	939
3	......	......	......	......	......	......	......	......	......	161	917	1,339
4	......	......	......	......	......	......	......	......	......	161	917	1,439
5	......	......	......	......	......	......	......	......	......	1,661	767	1,839
6	......	......	......	......	......	......	......	......	......	3,211	767	1,639
7	......	......	......	......	......	......	......	......	......	1,361	847	1,839
8	......	......	......	......	......	......	......	......	......	791	767	1.839
9	......	......	......	......	......	......	......	......	......	1,761	667	1,739
10	......	......	......	......	......	......	......	......	......	791	5,067	1,239
11	......	......	......	......	......	......	......	......	......	611	9,517	939
12	......	......	......	......	......	......	......	......	......	611	5,767	1,639
13	......	......	......	......	......	......	......	......	......	581	2,917	1,539
14	......	......	......	......	......	......	......	......	......	1,661	2,967	1,639
15	......	......	......	......	......	......	......	......	......	2,136	2,417	1,539
16	......	......	......	......	......	......	......	......	......	2,461	1,817	1,639
17	......	......	......	......	......	......	......	......	......	711	1,517	1,339
18	......	......	......	......	......	......	......	......	......	791	1,517	1,539
19	......	......	......	......	......	......	......	......	......	861	2,417	859
20	......	......	......	......	......	......	......	......	......	791	3.967	689
21	......	......	......	......	......	......	......	......	......	791	2,842	814
22	......	......	......	......	......	......	......	......	......	791	2,067	1,639
23	......	......	......	......	......	......	......	......	......	1.061	1.967	2.639
24	......	......	......	......	......	......	......	......	129	861	1,967	2,089
25	......	......	......	......	......	......	......	......	129	861	1,517	3,289
26	......	......	......	......	......	......	......	......	129	861	1,517	814
27	......	......	......	......	......	......	......	......	129	1,361	1,217	1,539
28	......	......	......	......	......	......	......	......	129	2.261	917	1,539
29	......	......	......	......	......	......	......	......	129	1,911	767	939
30	......	......	......	......	......	......	......	......	129	1,561	767	1,239
31	......	......	......	......	......	......	......	......	......	1,661	......	3,864
Mean	......	......	......	......	......	......	......	......	129	1,142	2,148	1,573
1899.												
1	1,741	1,651	4,915	1,335	1,515	295	182	148	148	3,867	935	......
2	1,641	1,351	3,655	1,335	1,460	295	178	152	148	1,967	1,615	......
3	1,641	1,651	3,165	1,335	1,560	395	182	145	145	1,767	1,515	......
4	941	1,251	2,935	2,135	1,140	395	182	138	145	2,247	935	......
5	5,791	1,251	6,635	2,785	860	295	185	142	148	2,467	935	......
6	4,791	951	13,635	3,185	860	295	165	145	148	1,967	765	......
7	3,541	951	6,235	3,655	710	295	190	148	148	1,767	935	......
8	3,141	851	3,435	7,685	585	225	195	138	142	1,547	935	......
9	3,541	901	2,935	5,335	585	205	198	138	152	1,767	785	......
10	2,241	901	3,535	3,655	610	195	185	135	152	967	765	......
11	1,991	851	4,085	4,585	441	195	182	138	152	967	935	......
12	1,641	851	7,685	5,735	440	195	190	138	148	1,547	1,615	......
13	1,841	657	11,135	7,685	340	195	198	132	148	1,547	1,835	......
14	1,841	701	4,455	7,635	260	195	202	132	145	1,967	1,515	......
15	2.091	801	3,175	9,335	260	195	202	135	145	1,547	1,515	......
16	2,341	951	2,635	7,685	340	195	198	138	142	2,247	935	......
17	3,291	951	2,235	5,215	480	195	202	138	138	967	935	......
18	2,741	1,551	2,035	4,085	585	195	202	138	145	797	765	......
19	2,291	1,751	2,335	4,385	510	195	195	142	145	587	765	......
20	2,341	1,551	2,515	3,812	585	195	195	145	148	967	765	......
21	1,991	3,151	2,775	3,532	585	195	190	142	148	797	635	......
22	1,641	2,876	2,775	2,342	510	195	185	148	148	587	635	......
23	1,541	3,407	2,775	3,532	440	195	185	148	148	967	453	......
24	1,541	3,726	2,635	3,342	340	195	165	142	148	797	453	......
25	2,741	3,726	2,515	3,193	340	195	198	145	152	1,967	515	......
26	1,991	4,301	2,335	3,883	260	195	190	148	182	1,767	455	......
27	2,091	4,885	2,035	2,633	260	195	185	142	6,984	2,147	425	......
28	1,841	6,035	2,135	2,698	260	195	182	148	6,120	1,547	335	......
29	1,541	......	1,435	2,298	340	195	190	145	5,740	1,967	335	......
30	1,641	......	1,335	2,048	260	195	190	148	4,790	2,147	295	......
31	1,541	......	1,435	......	260	......	190	145	......	1,547	......	......
Mean	2,307	1,944	3,792	4,100	579	226	187	142	916	1,603	875	......

Mean Daily Flow in Second-feet of Schoharie Creek at Fort Hunter, Montgomery Co., N. Y.— (Concluded).

DAY.	Jan.	* Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1....	735	.....	3,465	2,915	835	360	111	.....	.....	.....	.....	635
2....	735	.....	7,335	2,775	985	155	102	.....	.....	.....	.....	535
3....	575	.....	7,515	3,335	835	245	102	.....	.....	.....	.....	535
4....	575	.....	6,785	3,635	985	245	111	.....	.....	.....	.....	1,195
5....	435	.....	5,585	3,335	1,208	284	90	.....	.....	.....	.....	2,785
6....	315	.....	2,485	3,335	490	239	76	.....	.....	.....	.....	1,885
7....	435	.....	3,335	3,635	412	212	76	.....	.....	.....	.....	1,435
8....	315	.....	3,335	2,635	409	242	76	.....	.....	.....	.....	1,315
9....	485	.....	3,035	2,495	315	515	135	.....	.....	.....	.....	1,085
10....	435	.....	2,740	2,135	519	276	140	.....	.....	.....	.....	1,085
11....	315	.....	3,335	2,015	472	360	143	.....	.....	.....	.....	635
12....	365	.....	3,035	2,015	390	305	140	.....	.....	.....	.....	385
13....	485	.....	2,775	2,275	300	305	135	.....	.....	.....	.....	455
14....	575	.....	2,355	2,915	293	257	127	.....	.....	.....	.....	55
15....	435	.....	2,255	2,915	312	260	123	.....	.....	.....	.....	315
16....	575	.....	2,015	3,635	327	260	118	.....	.....	.....	.....	315
17....	575	.....	1,885	4,735	319	235	118	.....	.....	.....	.....	315
18....	735	.....	1,755	6,035	312	220	111	.....	.....	.....	.....	315
19....	2,785	.....	1,755	4,935	330	157	111	.....	.....	.....	.....	465
20.. .	4,595	.....	1,755	4,595	1,530	153	111	.....	.....	.....	.....	635
21....	8,235	.....	3,035	5,355	1,550	147	106	.....	.....	.....	255	635
22....	4,595	.....	2,135	6,615	1,020	143	72	.....	.....	.....	55	635
23....	3,465	.....	1,755	6,615	500	139	122	.....	.....	.....	35	635
24....	3,145	.....	2,495	5,095	412	139	130	.....	.....	.....	255	635
25....	1,325	.....	2,275	4,035	409	139	144	.....	.....	.....	.....	3,815
26....	735	.....	2,635	3,335	315	105	135	.....	.....	.....	635	2,785
27....	735	.....	2,495	2,915	315	113	127	.....	.....	.....	5,355	1,085
28....	485	.....	2,775	2,635	250	122	127	.....	.....	.....	2,595	855
29....	575	.....	3,035	1,885	322	122	118	.....	.....	.....	1,315	735
30....	485	.....	3,035	1,325	355	122	118	.....	.....	.....	1,075	635
31....	435	.....	3,035	.....	360	.....	111	.....	.....	.....	.....	635
Mean.	1,313	.....	3,137	3,530	561	219	115	.....	.....	.....	1,286	950
1901.												
1....	855	1,075	4,215	1,315	.....	.....	.....	.....	.....	.....	.....	.....
2....	855	1,075	4,215	1,315	.....	.....	.....	.....	.....	.....	.....	.....
3....	855	1,075	4,215	1,855	.....	.....	.....	.....	.....	.....	.....	.....
4....	195	1,075	4,215	2,955	.....	.....	.....	.....	.....	.....	.....	.....
5....	195	1,075	4,215	6,185	.....	.....	.....	.....	.....	.....	.....	.....
6....	385	1,075	2,015	6,595	.....	.....	.....	.....	.....	.....	.....	.....
7....	635	1,075	1,855	13,115	.....	.....	.....	.....	.....	.....	.....	.....
8....	635	1,075	1,855	12,085	.....	.....	.....	.....	.....	.....	.....	.....
9....	855	2,155	1,735	7,155	.....	.....	.....	.....	.....	.....	.....	.....
10....	855	2,155	2,015	4,935	.....	.....	.....	.....	.....	.....	.....	.....
11....	1,085	2,155	3,815	4,215	.....	.....	.....	.....	.....	.....	.....	.....
12.. .	1,185	2,015	8,555	3,635	.....	.....	.....	.....	.....	.....	.....	.....
13....	1,315	1,855	4,935	3,815	.....	.....	.....	.....	.....	.....	.....	.....
14....	1,315	1,315	3,815	3,635	.....	.....	.....	.....	.....	.....	.....	.....
15....	1,315	1,315	4,215	3,435	.....	.....	.....	.....	.....	.....	.....	.....
16....	855	1,315	4,755	3,285	.....	.....	.....	.....	.....	.....	.....	.....
17....	855	1,075	3,815	2,955	.....	.....	.....	.....	.....	.....	.....	.....
18....	855	735	3,815	2,785	.....	.....	.....	.....	.....	.....	.....	.....
19....	855	465	5,355	2,465	.....	.....	.....	.....	.....	.....	.....	.....
20....	855	1,075	6,015	2,315	.....	.....	.....	.....	.....	.....	.....	.....
21....	855	1.185	8,555	12,335	.....	.....	.....	.....	.....	.....	.....	.....
22....	855	3,815	6,395	28,515	.....	.....	.....	.....	.....	.....	.....	.....
23....	1,315	1,185	3,635	14,435	.....	.....	.....	.....	.....	.....	.....	.....
24....	1,315	1,075	3,815	9,685	.....	.....	.....	.....	.....	.....	.....	.....
25....	1,455	1,075	5,185	20,555	.....	.....	.....	.....	.....	.....	.....	.....
26....	1,585	855	7,485	11,835	.....	.....	.....	.....	.....	.....	.....	.....
27....	1,585	855	8,795	6,015	.....	.....	.....	.....	.....	.....	.....	.....
28....	1,585	735	5,185	.....	.....	.....	.....	.....	.....	.....	.....	.....
29....	1,315	.....	2,785	.....	.....	.....	.....	.....	.....	.....	.....	.....
30....	1,075	.....	2,015	.....	.....	.....	.....	.....	.....	.....	.....	.....
31....	1,075	.....	1,315	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean.	998	1,393	4,348	7,165	.....	.....	.....	.....	.....	.....	.....	.....

* No record kept.

SCHOHARIE CREEK AT MILL POINT, MONTGOMERY COUNTY, N. Y.

A current meter station was established at Mill Point highway bridge on July 5, 1900. The stream bed is stony and fairly permanent. The channel is of nearly constant width at all stages of the stream.

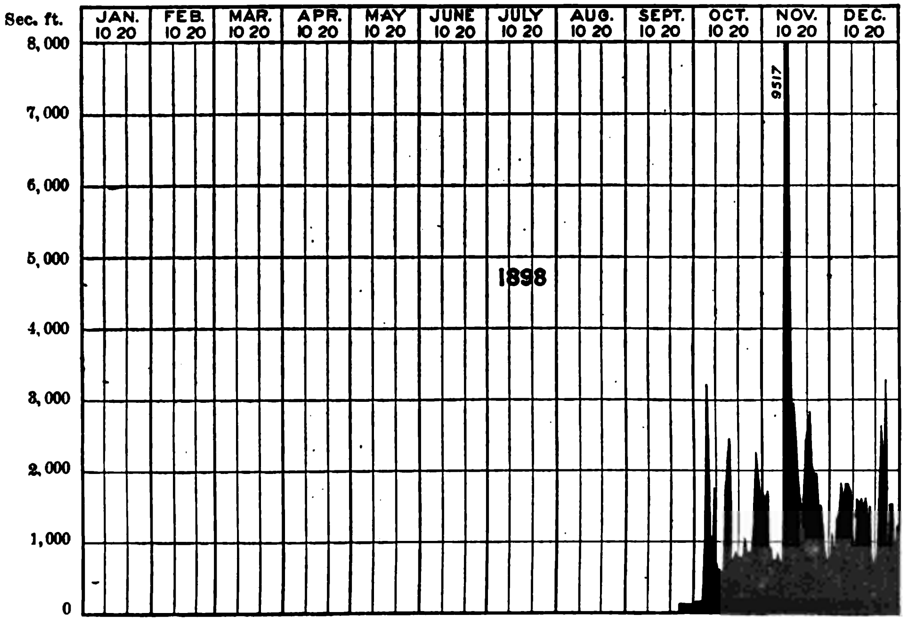
Daily Gauge Height in feet of Schoharie Creek at Mill Point, Montgomery Co., N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1								0.65	0.35	0.50	0.55	2.10
2								.65	.35	.50	.45	1.90
3								.45	.35	.45	.60	1.80
4								.40	.30	.40	.60	1.70
5								.50	.25	.40	.50	3.02
6							0.60	.35	.22	.45	.40	2.60
7							.35	.40	.40	.35	.60	2.35
8							.70	.35	.30	.30	.60	2.25
9							.50	.30	.30	.15	.65	2.10
10							.80	.30	.25	.00	.85	1.80
11							.70	.40	.45	.00	.60	1.75
12							.70	.40	.45	.35	.60	1.75
13							.60	.45	.35	.45	.80	1.72
14							.60	.30	.35	.15	.90	1.70
15							.60	.25	.30	.30	.72	1.65
16							.65	.40	.35	.30	.70	1.60
17							.60	.95	.35	.40	.65	1.65
18							.65	1.45	.30	.45	.70	1.70
19							.65	.95	.35	.45	.75	1.82
20							.65	.72	.25	.45	.98	1.95
21							.60	.70	.00	.40	1.45	2.30
22							.95	.75	.00	.30	1.42	2.10
23							.90	.70	.00	.60	1.50	1.70
24							.80	.60	.30	.60	1.35	1.88
25							.85	.55	.35	.50	1.30	2.95
26							.80	.50	.30	.70	1.72	3.70
27							.80	.45	.30	.75	3.60	1.70
28							.80	.50	.35	.52	2.75	2.05
29							.70	.50	.45	.45	2.25	1.95
30							.70	.55	.45	.52	2.15	1.50
31							.65	.43		.50		1.60

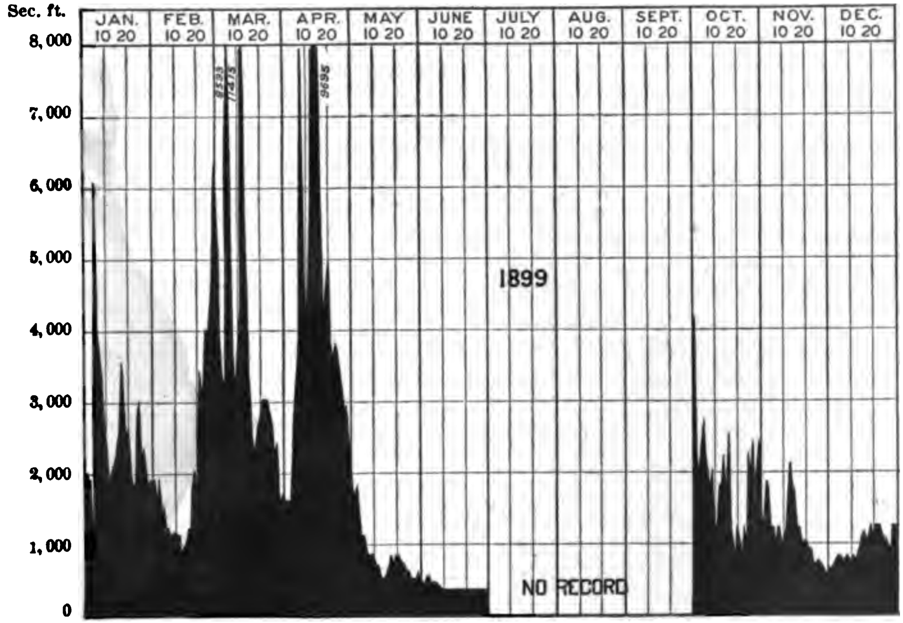
Daily Gauge Height of Schoharie Creek at Mill Point, Montgomery Co. N. Y.—(Concluded).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1.	1.65	2.20	2.15	2.20	2.60	3.25	0.90	0.70	0.90	0.65	1.05	1.25
2.	1.60	2.10	2.15	2.00	*a*	3.35	.85	.70	1.75	.70	1.0	1.5
3.	1.55	2.20	2.15	2.10	*a*	3.45	.80	.65	1.60	.75	.90	1.45
4.	1.45	2.20	2.15	3.00	*a*	3.05	.80	.60	1.50	.70	.90	1.55
5.	1.40	2.20	2.15	4.02	*a*	2.55	.75	.60	1.45	.65	.85	1.6
6.	1.35	2.20	2.15	3.72	*a*	1.95	.85	.60	1.30	.65	.85	1.6
7.	1.45	2.20	2.15	6.25	*a*	1.90	1.55	.55	1.25	.60	.80	1.55
8.	1.40	2.20	2.15	6.75	*a*	3.35	1.50	.70	1.1	.55	.75	1.5
9.	1.40	2.20	2.20	4.50	*a*	2.50	1.40	.75	1.0	.55	.75	2.0
10.	1.45	2.15	2.20	3.65	*a*	2.45	1.35	1.0	.8	.50	.70	3.37
11.	1.40	2.15	2.25	.....	*a*	2.30	1.25	.95	.75	.45	.70	3.65
12.	1.40	2.15	3.30	.....	3.10	2.05	1.20	.90	1.0	.40	.75	2.95
13.	1.45	2.15	3.20	.....	3.58	1.80	1.20	.90	.9	.40	.95	2.5
14.	1.40	2.15	2.80	3.20	2.80	1.50	1.20	.85	.85	2.50	1.0	3.6
15.	1.50	2.15	2.10	3.25	2.35	1.35	1.15	.85	.85	2.30	1.0	11.7
16.	1.75	2.15	2.00	3.30	2.15	1.35	1.10	.90	.85	2.10	1.1	5.1
17.	1.80	2.15	1.75	3.20	2.35	1.35	1.10	.85	.95	2.0	1.15	4.1
18.	1.85	2.15	1.60	3.25	2.50	1.30	1.30	.80	.9	1.90	1.15	2.8
19.	1.80	2.15	1.85	3.20	2.70	1.25	1.65	.75	.85	1.80	1.20	2.0
20.	1.90	2.15	2.10	3.25	2.80	1.20	1.55	.70	.85	1.80	1.30	2.0
21.	2.05	2.15	3.82	7.60	2.75	1.15	1.35	2.07½	.85	1.80	1.25	1.95
22.	2.10	2.15	4.67	8.30	2.50	1.00	1.15	1.45	.8	1.75	1.20	1.8
23.	2.40	2.15	4.50	7.00	2.30	2.53	1.05	1.40	.8	1.40	1.15	1.8
24.	2.30	2.15	4.15	7.75	2.20	2.50	.90	1.52½	.85	1.1	1.15	1.7
25.	2.45	2.15	4.40	7.70	2.40	1.75	.85	2.20	.8	.85	1.10	1.7
26.	2.30	2.15	4.70	.....	2.35	1.25	.80	1.85	.75	.70	1.0	1.6
27.	2.40	2.15	5.50	.....	2.80	1.05	.70	1.60	.70	.70	1.0	1.55
28.	2.40	2.15	4.70	3.10	3.35	1.00	.75	1.55	.65	.70	1.2	1.45
29.	2.45	.....	2.90	2.90	3.20	.95	.70	1.35	.65	.70	1.30	1.40
30.	2.40	.....	3.45	2.70	3.15	.90	.70	1.15	.60	.70	1.25	3.57
31.	2.35	....	2.30	.....	3.05	.....	.70	1.00	.....	.90	.....	2.95
1902.												
1.	2.9	1.45	9.85	4.00	2.55	1.25	2.00	2.30	0.85	4.15	2.45	1.55
2.	2.5	1.45	7.6	3.70	2.35	1.15	2.00	3.20	.80	3.50	2.20	1.50
3.	1.85	1.45	6.70	3.50	2.15	1.10	1.95	2.90	.75	2.75	2.15	1.45
4.	1.7	1.45	4.80	2.90	1.90	1.50	1.95	2.45	.70	2.70	2.10	1.60
5.	1.6	1.40	4.20	2.50	2.00	1.45	2.00	2.95	.65	2.70	2.00	1.65
6.	1.6	1.4	3.60	2.10	1.85	1.35	2.05	1.70	.65	2.35	1.90	1.75
7.	1.55	1.35	2.85	2.05	1.70	1.25	2.05	1.60	.60	2.20	1.80	1.80
8.	1.5	1.35	2.25	2.05	1.65	1.25	2.10	1.40	.60	2.05	1.75	1.90
9.	1.5	1.35	2.15	7.25	1.60	1.20	2.00	1.20	.60	1.95	1.60	2.30
10.	1.5	1.40	3.10	6.90	1.50	1.20	1.85	1.40	.55	1.70	1.55	3.00
11.	1.45	1.50	3.70	4.10	1.45	1.15	1.65	1.50	1.60	1.65	1.55	3.10
12.	1.45	1.55	5.95	3.80	1.40	1.30	1.55	1.50	1.55	1.80	1.50	3.05
13.	1.45	1.50	6.87	3.60	1.40	1.25	1.40	1.45	1.55	2.50	1.50	2.95
14.	1.45	1.50	5.20	3.50	1.35	1.25	1.25	1.35	1.50	2.25	1.45	2.90
15.	1.40	1.50	4.00	3.00	1.35	1.20	1.15	1.25	1.45	2.10	1.40	2.90
16.	1.35	1.45	6.85	3.00	1.30	1.20	1.10	1.15	1.35	1.90	1.40	2.95
17.	1.35	1.45	4.80	2.80	1.25	1.20	1.05	1.10	1.30	1.75	1.35	4.90
18.	1.30	1.40	4.75	2.50	1.20	1.15	1.00	1.05	1.30	1.70	1.30	3.60
19.	1.30	1.40	3.75	2.00	1.20	1.15	.95	1.90	1.25	1.70	1.30	3.50
20.	1.30	1.40	2.40	2.05	1.15	1.10	1.67	1.85	1.60	1.65	1.30	3.40
21.	1.35	1.45	2.30	2.00	1.10	1.20	6.47	1.50	1.60	1.60	1.30	3.45
22.	1.50	1.50	2.80	1.95	1.05	1.20	5.10	1.30	1.35	1.55	1.25	6.60
23.	4.30	1.50	2.95	1.95	1.00	1.25	4.50	1.15	1.20	1.50	1.25	6005
24.	3.15	1.50	2.95	1.90	.95	1.25	4.20	1.05	1.15	1.45	1.25	3.10
25.	2.3	1.50	2.90	1.90	.95	1.20	4.10	1.00	1.10	1.40	1.25	2.75
26.	2.15	1.55	3.15	1.85	.95	1.20	3.10	.90	1.20	1.35	1.20	2.50
27.	2.2	1.55	3.25	1.80	1.00	1.15	2.80	.80	1.80	1.30	1.20	2.40
28.	2.0	1.60	3.50	1.80	1.10	1.10	2.60	.85	4.02	4.12	1.70	2.35
29.	1.85	.....	3.80	1.75	1.20	1.10	2.50	.90	5.85	4.20	1.65	2.15
30.	1.75	.....	4.00	2.10	1.35	1.10	2.30	.90	4.80	2.90	1.55	2.10
31.	1.6	.....	4.10	.. ..	1.30	.....	2.30	.85	.....	2.70	.....	2.15

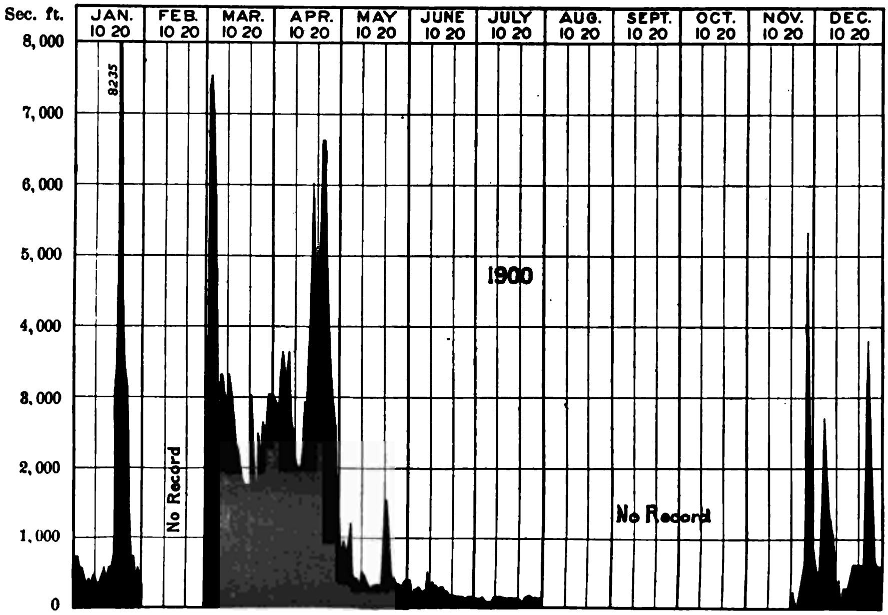
a No record kept.



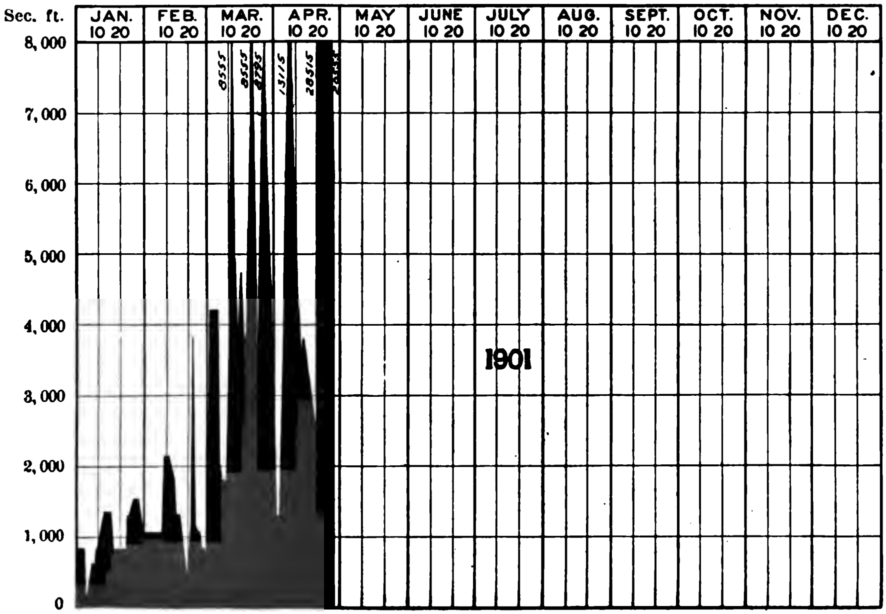
Discharge of Schoharie Creek at Fort Hunter, Montgomery County, N. Y., 1898.



Discharge of Schoharie Creek at Fort Hunter, Montgomery County, N. Y., 1899.



Discharge of Schoharie Creek at Fort Hunter, Montgomery County, N. Y., 1900.



Discharge of Schoharie Creek at Fort Hunter, Montgomery County, N. Y., 1901.

Current meter measurements were made as follows:

DATE.	Gauge height.	Discharge second-feet.	Hydrographer.
July 5, 1900	0.64	87	E. D. Walker.
August 22, 1900	0.47	141	E. D. Walker.

The station was abandoned early in 1901, but was resumed temporarily in order to maintain a continuous record until repairs are completed at the Schoharie Falls station one mile upstream.

SCHOHARIE CREEK AT SCHOHARIE FALLS, MONTGOMERY COUNTY, N. Y.

A dam and power plant were erected by the Empire State Power Company of Amsterdam, N. Y., at Schoharie Falls, 7 miles from the city of Amsterdam in 1900.[a] A record of the stream was kept, beginning July 18, 1900. April 22, 1901, the record was temporarily discontinued during repairs of injuries resulting from high water of that date.

Soon after the completion of the dam, a weir of standard form was placed in an opening in the water power canal embankment, at a point where the entire flow of the stream could be concentrated so as to pass over the gauging weir. The weir had a sharp crest 25 feet in length, with two complete contractions, and the observations of flow given below were computed from the observed depth by means of the Francis formula.

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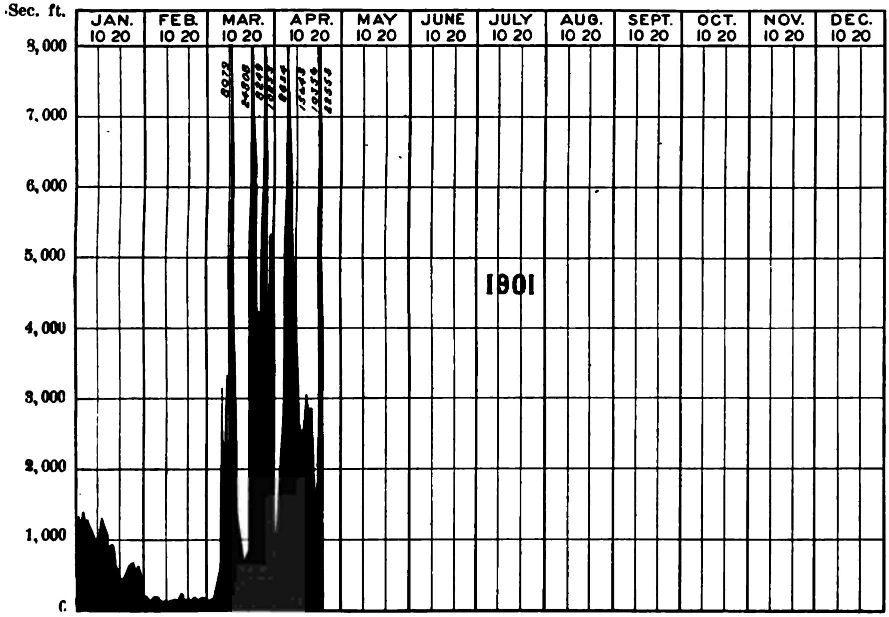
[a] Described in Engineering Record, Aug. 10, 1901, pp. 122-125.

Mean Daily Flow in Second-feet of Schoharie Creek at Schoharie Falls, Montgomery Co., N. Y
[Drainage area, 930 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	.....	.....	.....	.....	.....	.....	.....	87.75	43.9	25.7	74.7	1,000.8
2	.....	.....	.....	.....	.....	.....	.....	66.8	43.9	26.9	73.0	937.2
3	.....	.....	.....	.....	.....	.....	.....	57.9	41.95	25.3	68.1	983.5
4	.....	.....	.....	.....	.....	.....	.....	44.3	41.4	25.4	68.6	2,011.5
5	.....	.....	.....	.....	.....	.....	.....	38.2	50.4	25.1	68.7	1,901.0
6	.....	.....	.....	.....	.....	.....	.....	32.5	47.4	25.9	69.7	1,825.0
7	.....	.....	.....	.....	.....	.....	.....	36.2	42.7	28.0	71.15	1,788.7
8	.....	.....	.....	.....	.....	.....	.....	31.9	41.6	25.1	73.5	1,699.5
9	.....	.....	.....	.....	.....	.....	.....	24.9	35.9	25.7	82.0	1,511.8
10	.....	.....	.....	.....	.....	.....	.....	21.4	33.9	30.1	86.0	1,151.2
11	.....	.....	.....	.....	.....	.....	.....	21.4	32.95	31.2	86.1	939.6
12	.....	.....	.....	.....	.....	.....	.....	20.2	33.9	31.5	121.7	930.3
13	.....	.....	.....	.....	.....	.....	.....	24.9	33.8	32.15	214.5	913.2
14	.....	.....	.....	.....	.....	.....	.....	20.8	31.0	33.1	215.5	901.7
15	.....	.....	.....	.....	.....	.....	.....	20.65	30.1	32.4	213.6	801.5
16	.....	.....	.....	.....	.....	.....	.....	29.0	29.7	39.1	216.3	815.8
17	.....	.....	.....	.....	.....	.....	.....	592.9	28.0	41.7	224.1	809.2
18	.....	.....	.....	.....	.....	.....	105.6	344.2	27.8	36.95	235.7	811.7
19	.....	.....	.....	.....	.....	.....	96.65	294.9	27.3	35.2	273.0	813.1
20	.....	.....	.....	.....	.....	.....	87.7	153.0	26.2	35.7	319.7	859.8
21	.....	.....	.....	.....	.....	.....	209.4	101.3	25.0	37.2	615.1	954.6
22	.....	.....	.....	.....	.....	.....	123.3	96.7	23.9	36.8	607.1	1,074.1
23	.....	.....	.....	.....	.....	.....	118.2	96.5	23.7	52.0	581.5	1,150.1
24	.....	.....	.....	.....	.....	.....	114.6	87.6	23.8	53.6	593.0	1,588.5
25	.....	.....	.....	.....	.....	.....	127.5	72.3	24.9	53.5	609.1	4,205.5
26	.....	.....	.....	.....	.....	.....	114.85	66.1	21.4	52.4	952.1	3,701.5
27	.....	.....	.....	.....	.....	.....	115.2	60.7	20.8	72.1	1,858.1	3,252.5
28	.....	.....	.....	.....	.....	.....	105.6	57.6	24.9	69.7	1,652.0	2,852.6
29	.....	.....	.....	.....	.....	.....	98.7	53.3	24.9	70.7	1,465.5	2,251.7
30	.....	.....	.....	.....	.....	.....	87.7	57.6	31.0	67.9	1,021.5	938.5
31	.....	.....	.....	.....	.....	.....	87.9	50.4	.....	72.7	....	935.7
Mean	.....	.....	.....	.....	.....	.....	110	89	32	40	427	1,526
1901.												
1	1,244	199	159	656	.....	.....	.....	.....	.....	.....	.....	.....
2	1,369	193	169	1,170	.....	.....	.....	.....	.....	.....	.....	.....
3	1,165	139	169	1,568	.....	.....	.....	.....	.....	.....	.....	.....
4	1,417	169	169	2,743	.....	.....	.....	.....	.....	.....	.....	.....
5	1,272	169	320	5,604	.....	.....	.....	.....	.....	.....	.....	.....
6	1,298	169	521	8,634	.....	.....	.....	.....	.....	.....	.....	.....
7	1,183	169	649	15,643	.....	.....	.....	.....	.....	.....	.....	.....
8	1,053	157	3,180	6,029	.....	.....	.....	.....	.....	.....	.....	.....
9	1,002	149	451	4,952	.....	.....	.....	.....	.....	.....	.....	.....
10	937	141	3,376	4,412	.....	.....	.....	.....	.....	.....	.....	.....
11	1,044	127	1,239	3,717	.....	.....	.....	.....	.....	.....	.....	.....
12	1,126	143	8,079	2,617	.....	.....	.....	.....	.....	.....	.....	.....
13	1,377	161	5,220	2,470	.....	.....	.....	.....	.....	.....	.....	.....
14	1,234	195	2,226	2,832	.....	.....	.....	.....	.....	.....	.....	.....
15	1,006	165	1,375	3,002	.....	.....	.....	.....	.....	.....	.....	.....
16	916	199	955	2,854	.....	.....	.....	.....	.....	.....	.....	.....
17	931	268	789	2,866	.....	.....	.....	.....	.....	.....	.....	.....
18	917	183	675	2,554	.....	.....	.....	.....	.....	.....	.....	.....
19	641	143	880	1,366	.....	.....	.....	.....	.....	.....	.....	.....
20	557	141	610	2,356	.....	.....	.....	.....	.....	.....	.....	.....
21	471	149	24,808	10,356	.....	.....	.....	.....	.....	.....	.....	.....
22	423	159	8,249	22,553	.....	.....	.....	.....	.....	.....	.....	.....
23	466	169	6,354	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	553	149	4,255	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	651	149	4,135	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	680	169	4,811	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	696	169	10,853	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	556	169	3,605	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	647	.....	5,330	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	562	.....	1,148	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	388	.....	643	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean	896	166	3,400	5,043	.....	.....	.....	.....	.....	.....	.....	.....



Discharge of Schoharie Creek at Schoharie Falls, Schoharie County, N. Y., 1901.

Weir Measurements of Schoharie Creek at Schoharie Falls, Montgomery Co., N. Y.

DATE.	Time.	Second-feet.
1901.		
June 25	11 A. M.	86.2
June 26	11 A. M.	91.6
June 26	5 P. M.	91.5
June 27	11 A. M.	92.9
June 27	5 P. M.	92.9
June 28	11 A. M.	86.2
June 28	5 P. M.	91.5
June 29	11 A. M.	86.2
June 29	5 P. M.	86.2
June 30	11 A. M.	92.9
June 30	5 P. M.	92.9
July 1	11 A. M.	92.9
July 1	5 P. M.	91.5
July 2	11 A. M.	91.6
July 2	5 P. M.	92.9
July 3	9 A. M.	93.4

From July 18 to December 31, 1900, the power plant was not in operation, and the entire flow of the stream passed over the main spillway of the dam. The discharge was computed by F. J. Lempe, C. E., by means of the Francis formula.

The dam is of masonry, backed with timber. It has a flat crest, 1 foot in width and a slope on the upstream timber face of approximately 2½ to 1. The crest is 380 feet long. The elevation of the profile varies from 205.14 to 205.47 above datum. A discharge curve has been calculated by dividing the crest into six arbitrary sections, each assumed to be level. The coefficients of discharge used are those for a dam of similar cross sections calibrated in Cornell University experiment No. 5.[a]

Adjacent to the dam is an overflow having a crest 50 feet in length. Water is conducted to the power plant through an open earth canal 3,900 feet long. The power canal terminates in a gate house from which the water is fed to the turbines through two 150-foot steel penstocks, 8 feet internal diameter.

The power plant contains two pairs of 40-inch bronze bucket Leffel-Samson turbines in horizontal cases. The speed is regulated by means of Lombard governors and the record includes the mean gate openings as shown by these governors, and the working head on water wheels. A test was made of the discharge of pair No. 2 of turbines, April 5, 1901.

Working head on wheels, 35.61 feet.

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[a] Transactions Am. Soc. C. E. Vol. XLIV p. 276.

Average gate opening during test, 44.9 per cent, of full opening.

Discharge measurement by current meter in power canal, 216 second-feet.

Calculated discharge from manufacturer's rating table, 210 second-feet.

The waste by leakage of canal banks, wheel gates and penstocks has been estimated by Mr. Lempe as not more than 5 second-feet.

Excessive flood discharges at this station result from the breaking up of ice gorges formed farther upstream. During such a freshet on March 21, 1901, the water attained a depth of 11.2 feet on the crest of the dam, the calculated discharge being 49,600 second-feet or 53.3 second-feet per square mile from 930 square miles of tributary drainage area. April 22, 1901, heavy rains produced a freshet giving a discharge of 38,400 second-feet or 41.3 second-feet per square mile.

The record has been temporarily suspended pending repairs to the dam and canal resulting from injuries by high water.

Drainage Areas of Schoharie Creek.

LOCATION.	Drainage area, square miles.
Mouth	947
Erie Canal aqueduct	946.8
Fort Hunter dam	946.7
Mill Point Bridge	934
Schoharie Falls dam	930

Mean Monthly Run-off of Schoharie Creek at Schoharie Falls, Montgomery County, N. Y.
[Drainage area, 930 square miles.]

MONTH.	SECOND-FEET.		SECOND-FEET PER SQUARE MILE.		INCHES ON DRAINAGE AREA.	
	1900.	1901.	1900.	1901.	1900.	1901.
January	......	896	......	0.97	......	1.12
February	......	166	......	0.18	......	0.19
March	......	3,400	......	3.61	......	4.15
April	......	5,043	......	5.44	......	6.09
May	......	......	......	......	......	....
June	......	......	......	......	......	....
July	110	......	0.12	......	0.14	....
August	89	......	0.10	......	0.11	....
September	32	......	0.03	......	0.03	....
October	40	......	0.04	......	0.04	....
November	427	......	0.46	......	0.51	....
December	1,526	......	1.65	......	1.89	....

SCHOHARIE CREEK AT PRATTSVILLE, GREENE COUNTY, N. Y.

Schoharie Creek above Prattsville drains a rugged mountainous area almost entirely wooded. The watershed, embracing an area of 243 square miles lies wholly within Greene County. The basin is surrounded by continuous mountain ranges, and intervening ridges divide the main stream from its principal tributaries, Batavia Kill, East Kill and West Kill. The Upper Schoharie watershed is shown in part, on the Kaaterskill, Durham, Schoharie and Catskill sheets of the U. S. Geological Survey.

A gauging station was established at the highway bridge in Prattsville Village November 7, 1902, by C. C. Covert; the gauge datum is referred to the U. S. Geological Survey bench mark, an "O" marked on a boulder on right-hand end of bridge on the downstream side; elevation 1,151 feet. A fifteen-foot weight and wire gauge, having a boxed horizontal scale is attached to the steel floor beams of the bridge, on the upstream side. The elevation of the water surface when the gauge reads zero is 1,130.03. The bridge has a single span of 185 feet. Measurements are made on the downstream side. Bridge is divided into 10 foot intervals beginning at top of left-hand abutment.

The river stage is observed at 7 to 8 a. m. and 4 to 5 p. m. each day by James Brennan. A current-meter measurement by C. C. Covert November 7, 1902, showed a flow of 342 second-feet, the gauge height being 5.565. A measurement by F. H. Tillinghast December 4, 1902, showed discharge of 345 second-feet, gauge height 5.60.

Mean Daily Gauge Height of Schoharie Creek at Prattsville, Greene County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1												5.20
2												5.20
3												5.50
4												5.60
5												5.53
6												5.50
7												5.50
8												5.50
9											5.40	5.45
10											5.40	5.40
11											5.40	5.35
12											5.40	5.30
13											5.35	5.20
14											5.30	5.20
15											5.30	5.20
16											5.30	5.20
17											5.30	7.55
18											5.30	7.20
19											5.20	6.18
20											5.20	6.00
21											5.20	5.95
22											5.20	9.30
23											5.10	7.30
24											5.10	6.43
25											5.35	6.15
26											5.15	6.05
27											5 40	5.90
28											5.55	
29											5.30	
30											5.30	
31												

MOHAWK RIVER AT SCHENECTADY, SCHENECTADY COUNTY, N. Y.

A current meter station at Freeman's toll bridge, one mile below Schenectady, was established by Elton D. Walker, February 1, 1899.[a] A wire and weight gauge is used; the scale is attached horizontally to the guard-rail on the upstream side of the bridge and reads decimally from zero to 16 feet. A reading of the water stage is taken each morning by L. Diggins.

The bridge stands squarely across the stream. Its length between abutments is 417 feet. The piers and crib foundations obstruct the channel, which has a depth in high water of 20 feet or more. The station is 2½ miles above the Rexford Flats dam, and the water levels are essentially the same at the two stations. The current is exceptionally smooth and uniform. The entire flow of the river passes under the bridge, except in time of very unusual freshets. The current is sluggish during low water, owing to backwater from Rexford Flats dam, and discharge measurements for minimum stages are considered less reliable than those for higher gauge readings.

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[a] See Water Supply and Irrigation Paper, U. S. Geol. Survey, No. 35, p. 55.

Current Meter Discharge Measurements, Mohawk River, at Freeman's Bridge. Schenectady Co. N. Y.

DATE.	Gauge height, feet.	Discharge second-feet.	Hydrographer.
July 17, 1900	5.26	667	Elton D. Walker.
June 30, 1899	5.38 *b*	482	Elton D. Walker.
August 21, 1900	5.40	976	Elton D. Walker.
May 26, 1899	6.22 *b*	2,092	Elton D. Walker.
May 12, 1900	6.50	4,135	Elton D. Walker.
June 13, 1901	6.55	4,448	J. D. Luther.
May 27, 1901	6.73	5,406	J. D. Luther.
May 16, 1901	7.12	6,263	R. E. Horton.
April 3, 1899	7.18 *b*	5,294	Elton D. Walker.
May 14, 1901	8.28	10,719	R. E. Horton.
April 4, 1901	9.92	18,473	R. E. Horton.

b Meter No. 71, used in these measurements, needed rerating. Results subject to revision.

Mean Daily Flow in Second-feet of Mohawk River, at Schenectady, Schenectady County, N. Y.
[Drainage area, 3,321 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1	......	4,620	10,300	7,620	12,140	......	810	560	440	580	......	......
2	......	3,640	9,900	8,180	12,320	......	730	520	500	1,840	......	......
3	......	3,010	7,800	7,440	12,810	......	730	860	500	......	......	......
4	......	3,010	6,720	6,360	13,700	......	730	860	500	......	......	......
5	......	3,010	9,700	8,940	7,440	......	580	1,000	560	......	......	......
6	......	4,960	*a*	7,510	6,000	......	580	940	540	......	......	......
7	......	3,010	*a*	16,400	4,960	......	580	560	500	......	......	......
8	......	3,010	13,920	*a*	4,440	1,260	730	560	560	......	......	......
9	......	3,330	13,030	*a*	4,110	1,130	810	500	560	......	......	......
10	......	4,620	10,500	17,860	3,480	1,070	2,070	500	460	......	......	......
11	......	3,010	9,130	15,350	3,330	1,000	3,010	500	440	......	......	......
12	......	2,410	8,330	*a*	3,330	940	2,640	520	440	......	......	......
13	......	2,410	*a*	*a*	4,110	730	1,840	560	440	......	......	......
14	......	2,410	*a*	*a*	4,270	680	1,260	560	420	......	......	......
15	......	2,560	15,820	*a*	4,620	810	1,200	500	420	......	......	......
16	......	2,700	12,590	*a*	4,440	730	1,130	460	420	......	......	......
17	......	2,700	12,140	*a*	3,960	1,840	1,000	440	420	......	......	......
18	......	2,700	8,560	*a*	4,550	1,890	1,840	460	420	......	......	......
19	......	2,700	7,080	*a*	5,310	1,350	1,780	420	420	......	......	......
20	......	3,170	11,300	*a*	5,930	1,070	1,400	460	420	......	......	......
21	......	3,640	11,700	*a*	7,260	1,230	1,130	440	420	......	......	......
22	......	5,480	9,320	*a*	6,900	2,410	1,130	440	420	......	......	......
23	......	13,250	8,330	*a*	5,830	1,400	730	420	420	......	......	......
24	......	13,220	8,750	*a*	4,550	1,130	630	440	420	......	......	......
25	......	9,700	9,510	*a*	3,830	1,000	580	440	420	......	......	......
26	......	8,560	8,560	*a*	3,390	1,000	560	440	4,410	......	......	......
27	......	7,260	8,940	*a*	3,010	940	560	440	9,900	......	......	......
28	......	10,100	6,900	18,300	2,860	810	560	460	3,800	......	......	......
29	......	......	6,360	16,060	3,330	940	560	420	2,410	......	......	......
30	......	......	8,750	13,300	4,960	860	780	440	1,980	......	......	......
31	......	......	6,830	......	6,000	......	500	440	......	......	......	......
Mean	......	4,792	9,659	11,941	5,715	1,140	1,070	534	1,133	......	......	......

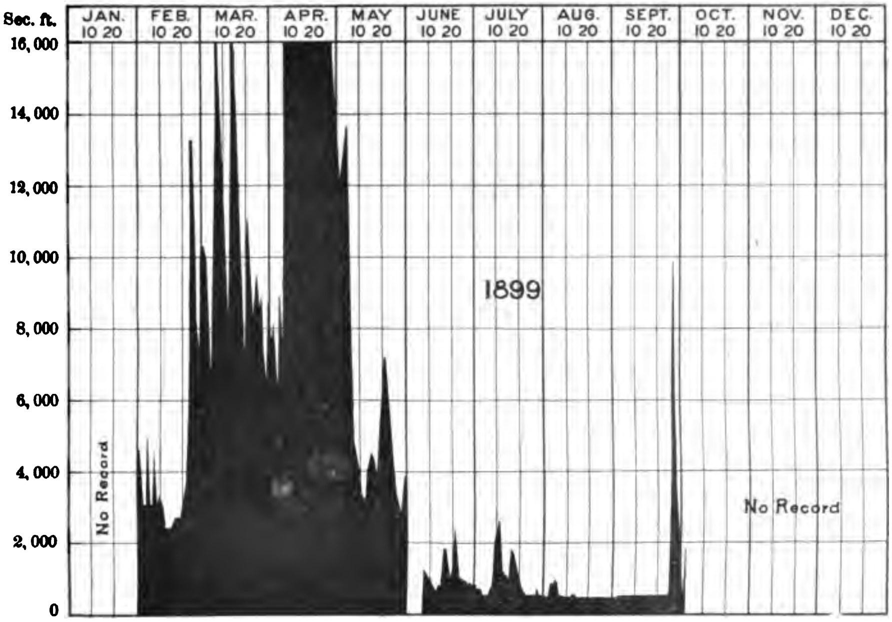
a Exceeds limit of rating curve.

Mean Daily Flow in Second-feet of Mohawk River at Schenectady, Schenectady County, N. Y.—(Concluded.)

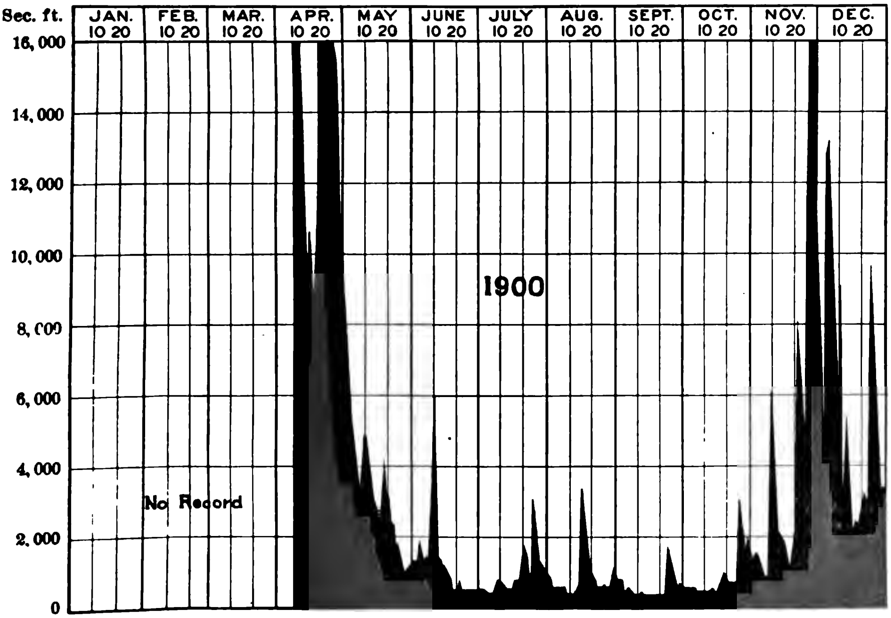
[Drainage area, 3,321 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	......	......	......	......	7,440	1,260	580	940	860	560	1,400	8,940
2	......	......	......	......	7,440	1,260	560	860	600	600	1,550	7,260
3	......	......	......	......	6,360	1,260	580	600	580	560	1,490	6,000
4	......	......	......	......	5,650	1,980	520	580	560	600	1,260	5,130
5	......	......	......	......	5,310	1,660	500	600	440	560	1,130	12,810
6	......	......	......	......	4,750	1,400	560	560	500	560	1,050	13,250
7	......	......	......	......	4,110	1,550	560	500	580	420	860	10,300
8	......	......	......	*a*	3,330	1,000	560	520	500	440	940	9,700
9	......	......	......	*a*	4,110	1,550	600	440	520	520	3,950	8,560
10	......	......	......	13,250	4,960	4,110	860	440	420	440	6,180	6,900
11	......	......	......	10,420	4,960	6,000	1,000	440	440	440	4,620	5,130
12	......	......	......	9,320	4,270	1,980	860	440	500	500	3,170	3,170
13	......	......	......	10,700	3,480	1,550	780	440	440	500	2,270	4,960
14	......	......	......	10,000	3,010	1,400	730	500	440	600	2,120	5,480
15	......	......	......	8,940	2,860	1,260	730	600	440	500	1,980	3,330
16	......	......	......	10,120	2,700	1,260	680	3,480	440	520	1,840	2,700
17	......	......	......	11,700	2,860	1,130	700	2,410	420	560	1,660	2,270
18	......	......	......	*a*	2,700	1,050	560	2,120	440	560	1,260	2,560
19	......	......	......	*a*	2,560	860	580	1,610	420	1,050	1,550	2,410
20	......	......	......	*a*	3,010	580	860	1,130	420	860	2,120	2,700
21	......	......	......	*a*	4,270	600	860	1,000	440	560	5,830	3,170
22	......	......	......	*a*	3,330	600	1,000	780	440	560	8,180	3,330
23	......	......	......	*a*	3,010	860	1,840	600	440	520	1,080	3,010
24	......	......	......	*a*	2,560	580	1,490	560	1,840	560	6,000	3,010
25	......	......	......	*a*	2,410	560	1,070	600	1,350	680	4,960	4,960
26	......	......	......	15,590	1,980	560	940	680	1,130	3,170	11,620	9,700
27	......	......	......	12,140	1,840	520	3,170	580	860	2,700	*a*	4,620
28	......	......	......	10,700	1,400	560	2,860	560	540	1,840	*a*	6,290
29	......	......	......	8,640	1,260	580	1,890	600	680	1,660	*a*	4,960
30	......	......	......	7,620	1,130	560	1,400	560	580	1,980	11,700	3,960
31	......	......	......	......	1,260	......	1,260	1,130	......	1,660	......	3,480
Mean...	......	......	......	10,726	3,562	1,336	1,005	866	609	896	3,621	5,614
1901.												
1	3,640	2,560	1,550	10,500	8,790	9,320	1,400	3,010	1,130	1,550	860	1,400
2	3,800	2,120	1,400	8,560	7,440	10,100	1,260	2,410	1,550	1,660	860	1,550
3	2,700	1,660	1,260	8,750	7,260	11,300	1,260	1,840	3,490	1,980	730	3,010
4	2,120	1,550	1,400	18,300	6,720	10,820	1,130	1,400	3,490	1,660	600	4,440
5	3,010	1,550	1,660	*a*	5,310	9,130	1,130	1,000	3,330	1,840	730	6,540
6	2,120	1,260	1,840	*a*	4,270	7,080	1,260	860	2,860	1,550	730	2,560
7	1,980	1,400	1,980	*a*	3,480	11,500	4,110	1,000	2,120	1,490	680	1,980
8	2,410	1,260	1,840	*a*	3,010	*a*	3,640	1,260	1,660	1,260	600	1,692
9	2,120	1,550	1,660	*a*	2,700	13,220	3,010	1,260	1,260	1,260	680	1,692
10	2,560	1,660	1,980	*a*	2,410	10,100	2,270	2,120	1,130	1,260	560	2,124
11	3,640	1,400	3,640	17,860	3,330	7,990	1,840	2,270	1,260	1,130	730	*a*
12	3,960	1,836	6,180	14,870	8,520	5,830	1,840	3,170	1,550	1,000	1,000	17,080
13	4,890	1,660	7,800	14,160	11,930	4,620	1,780	2,860	1,550	1,000	1,400	13,698
14	3,700	1,550	6,000	13,920	11,500	3,800	1,550	2,120	2,120	2,120	6,900	9,700
15	3,330	1,660	5,650	14,160	8,520	3,490	1,260	1,840	2,410	5,480	5,480	*a*
16	3,080	1,400	6,540	14,400	6,320	2,700	1,130	1,840	2,560	6,900	3,960	*a*
17	3,010	1,840	6,540	13,480	4,960	2,270	1,130	2,120	2,860	4,620	4,750	*a*
18	3,640	1,660	6,180	13,120	4,750	1,980	1,260	2,120	3,800	3,490	2,700	15,824
19	3,450	1,400	7,260	13,480	7,620	1,660	1,840	1,660	3,170	3,010	2,560	10,900
20	2,700	1,550	9,510	12,590	8,180	1,780	1,660	1,260	2,860	3,170	2,410	8,560
21	3,960	1,660	11,220	14,160	8,330	1,550	1,660	1,000	2,560	2,640	2,010	5,481
22	2,560	1,830	*a*	*a*	6,720	3,640	1,490	2,410	1,660	2,270	2,010	3,799
23	2,410	1,550	*a*	*a*	5,650	8,560	1,130	3,800	1,400	2,180	2,120	4,789
24	3,330	1,400	18,300	*a*	6,900	9,900	860	2,120	1,130	1,980	1,840	3,642
25	3,010	1,260	13,700	*a*	6,720	9,790	1,000	2,410	1,130	1,660	1,660	4,270
26	2,700	1,400	*a*	*a*	6,000	6,360	860	3,010	1,050	1,400	2,860	4,443
27	2,560	1,130	*a*	18,300	4,960	3,330	730	2,410	860	1,260	3,010	3,642
28	5,030	1,400	*a*	13,250	5,480	2,410	600	1,840	780	1,260	2,860	3,799
29	3,960	......	*a*	10,300	10,820	1,980	1,000	1,550	860	1,000	1,400	3,642
30	1,660	......	16,300	8,750	10,100	1,660	1,130	1,260	1,130	1,000	1,550	4,443
31	2,410	......	12,140	......	10,900	......	1,260	1,260	......	1,000	......	8,560
Mean...	3,079	1,577	6,141	13,311	6,761	6,133	1,532	1,951	1,957	2,099	2,008	4,947

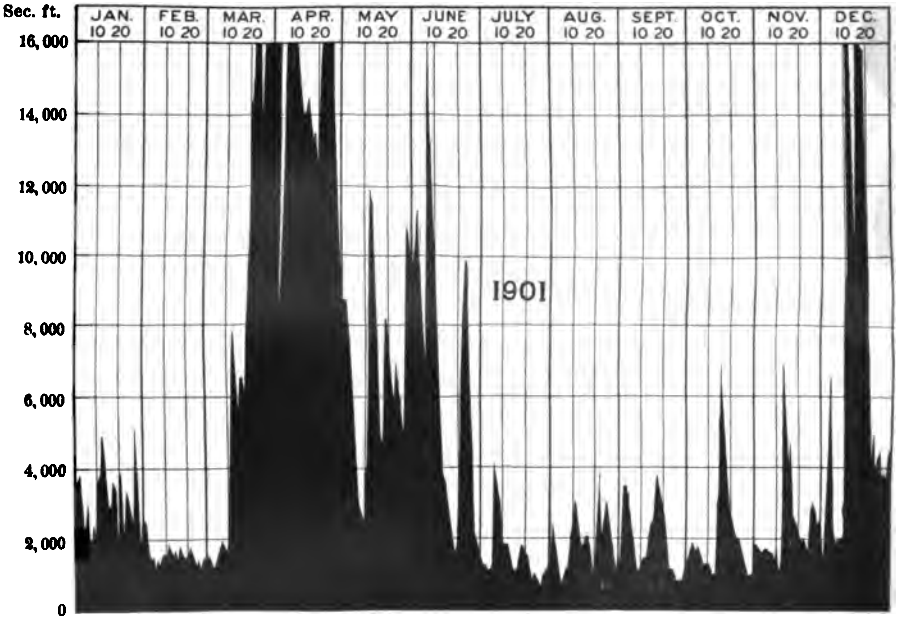
a Exceeds limit of rating curve.



Discharge of Mohawk River at Schenectady, Schenectady County, N. Y., 1899.



Discharge of Mohawk River at Schenectady, Schenectady County, N. Y. 1900.



Discharge of Mohawk River at Schenectady, Schenectady County, N. Y., 1901.

Mean Monthly Run-off of Mohawk River at Freeman's Bridge, Schenectady, Schenectady County, N. Y.

[Drainage area, 3,321 square miles.]

SECOND-FEET.

MONTH.	1899.	1900.	1901.
January	....	....	3,079
February	4,792	....	1,577
March	*a*	....	*a*
April	*a*	*a*	*a*
May	5,715	3,562	6,761
June	1,140	1,336	6,133
July	1,070	1,005	1,532
August	534	866	1,951
September	1,133	609	1,957
October	1,210	896	2,099
November	....	*a*	2,008
December	....	5,614	4,947

SECOND FEET PER SQUARE MILE.

MONTH.	1899.	1900.	1901.
January	......	......	.93
February	1.44	......	.48
March	*a*	......	*a*
April	*a*	*a*	*a*
May	1.72	1.07	2.03
June	.34	.40	1.85
July	.32	.30	.46
August	.16	.26	.59
September	.34	.18	.59
October	.36	.27	.63
November	......	1.09	.61
December	......	1.69	1.48

INCHES ON DRAINAGE AREA.

MONTH.	1899.	1900.	1901.
January	......	......	1.06
February	1.50	......	.50
March	*a*	......	*a*
April	*a*	*a*	*a*
May	1.98	1.23	2.28
June	.38	.45	2.07
July	.37	.35	.53
August	.18	.30	.68
September	.38	.20	.66
October	.41	.31	.72
November	.....	1.22	.68
December	.....	1.94	1.71

a Record incomplete. Discharges over 18,900 second-feet omitted.

A discharge-curve deduced from the meter observations has been used to reduce the gauge readings to equivalent volumes of flow. Tables showing the daily gauge height are given in connection with the slope gaugings of Mohawk River on page 199. Referring to pages 191 and 197, it will be seen that the three gauging stations on the Lower Mohawk, at Freeman's Bridge, Rexford Flats, and Dunsbach Ferry, show close agreement in the monthly run-off. Differences which appear in the mean daily discharge on simultaneous dates may be attributed to pond-storage; to diversion to Erie Canal at Rexford Flats, and to the fact that some time is required for water to travel from station to station. Of the three records, that kept at Dunsbach Ferry is probably most reliable. The percentage of error for either of the three is probably smaller for medium stages of the stream than for extreme high or extreme low water.

Drainage Areas Tributary to Lower Mohawk River Gauging Stations.

LOCATION	Square miles.	Difference square miles.
Schenectady	3,321	64
Rexford Flats	3,385	55
Dunsbach Ferry	3,440	28
Mouth of stream	3,468	....

Owing to practical duplication of the Lower Mohawk River records at Dunsbach Ferry, the gauge readings at Schenectady and Dunsbach Ferry were discontinued January 1 1902.

MOHAWK RIVER AT REXFORD FLATS, SARATOGA COUNTY, N. Y.

This gauging station is located at the New York State feeder dam, four miles below Schenectady. The dam is of masonry with a timber apron. Experiments on a similar cross section were made at Cornell University to determine the proper coefficients of discharge.[a]

The accompanying tables of daily and monthly mean flow include the amount of water diverted for Erie Canal supply. They therefore represent the total inflow of Mohawk River to the pond above the dam, which is considerably greater than the amount which passes downstream from the dam during the season of canal navigation. The amount of diversion to the Erie Canal, prior to 1900, was assumed to be constantly equal to 128 second-feet during navigation months. Beginning with 1900, the diversion has been estimated by another method. Current meter measurements of the flow in Rexford Flats feeder gave the following results:

---

[a] See Transactions, Am. Soc. C. E., Vol. XLIV, p 284

DATE.	Hydrographer.	Flow in canal feeder, second-feet
October 27, 1898	W. D. Lockwood	128
June 25, 1901	R. E. Horton	272
April 4, 1901	R. E. Horton	19[b]
May 15 1901	R. E. Horton	226

[b] Leakage of feeder gates.

A comparison of these results, with the mean monthly evaporation rate from a water surface for several years, as shown by records kept at Rochester, indicates that there is a nearly constant ratio between the water required for the canal and the mean monthly evaporation. The monthly diversion has been estimated from the above data by proportion, for each month of the canal season as follows:

MONTH.	Mean evaporation, inches.	Estimated diversion to canal, second-feet.
May	4.05	200
June	4.98	260
July	5.64	290
August	5.28	270
September	4.07	220
October	3.13	148
November	1.51	95

The flow over the dam taken alone, that is, the amount of water passing downstream from Rexford Flats during the canal months, has been estimated as follows, in second-feet:

MONTH.	1899.	1900.	1901.
May	3,956	2,657	6,146
June	1,886	1,243	6,408
July	370	1,157	1,540
August	166	1,476	1,050
September	752	761	1,775
October	1,480	536	811
November	2,696	8,335	1,995

The profile of the dam is quite irregular and is divided into five sections, each assumed to be level for purposes of computation. The water has not fallen below the crest since the establishment of the station and the profile of the dam obtained before the record was started, has been used throughout. The leakage of the dam has not been estimated.

When ice from Schoharie Creek and other tributaries flows out, and occasionally during other freshets caused by rainfall, the water on the downstream side rises above the level of the crest of the dam. Experiments on the flow over a similar submerged wier are not available. The high water flows have been taken from the discharge curve. The crest gauges are situated about 50 feet upstream from the dam. At flood stages of the stream, the water flows through the cross section opposite the gauges with a relatively high velocity of approach. Owing to this fact and to the drowning of the dam by backwater, the calculated flood discharges given below are considered as approximate only.

DATE.	Estimated discharge, second-feet.	Discharge, second-feet, per square mile.
February 14, 1900	55,700	16.5
April 22, 1901	49,460	14.6
December 15, 1901	54,250	16.0

Mean Daily Flow in Second-feet of Mohawk River at Rexford Flats, Saratoga County, N. Y.

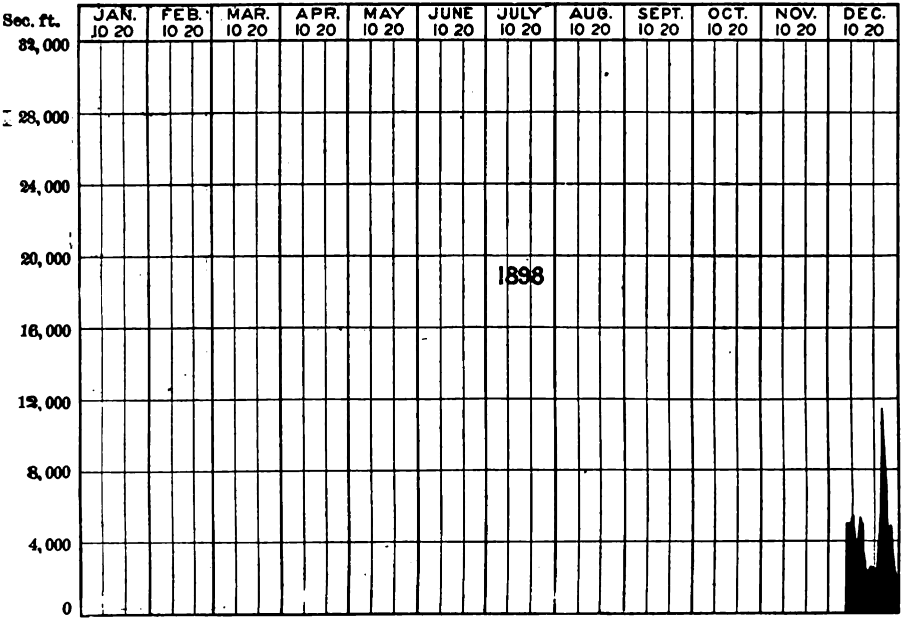
[Drainage area, 3,385 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1....	......	......	......	......	......	......	......	......	......	......	......	......
2....	......	......	......	......	......	......	......	......	......	......	......	......
3....	......	......	......	......	......	......	......	......	......	......	......	......
4....	......	......	......	......	......	......	......	......	......	......	......	......
5....	......	......	......	......	......	......	......	......	......	......	......	......
6....	......	......	......	......	......	......	......	......	......	......	......	......
7....	......	......	......	......	......	......	......	......	......	......	......	......
8....	......	......	......	......	......	......	......	......	......	......	......	5,050
9....	......	......	......	......	......	......	......	......	......	......	......	5,050
10....	......	......	......	......	......	......	......	......	......	......	......	5,050
11....	......	......	......	......	......	......	......	......	......	......	......	5,450
12....	......	......	......	......	......	......	......	......	......	......	......	4,200
13....	......	......	......	......	......	......	......	......	......	......	......	3,625
14....	......	......	......	......	......	......	......	......	......	......	......	5,250
15....	......	......	......	......	......	......	......	......	......	......	......	4,950
16....	......	......	......	......	......	......	......	......	......	......	......	3,250
17....	......	......	......	......	......	......	......	......	......	......	......	2,450
18....	......	......	......	......	......	......	......	......	......	......	......	2,300
19....	......	......	......	......	......	......	......	......	......	......	......	2,675
20....	......	......	......	......	......	......	......	......	......	......	......	2,550
21....	......	......	......	......	......	......	......	......	......	......	......	2,300
22....	......	......	......	......	......	......	......	......	......	......	......	2,850
23....	......	......	......	......	......	......	......	......	......	......	......	5,150
24....	......	......	......	......	......	......	......	......	......	......	......	11,550
25....	......	......	......	......	......	......	......	......	......	......	......	9,350
26....	......	......	......	......	......	......	......	......	......	......	......	7,350
27....	......	......	......	......	......	......	......	......	......	......	......	4,450
28....	......	......	......	......	......	......	......	......	......	......	......	4,900
29....	......	......	......	......	......	......	......	......	......	......	......	3,350
30....	......	......	......	......	......	......	......	......	......	......	......	2,400
31....	......	......	......	......	......	......	......	......	......	......	......	1,800
Mean.	......	......	......	......	......	......	......	......	......	......	......	4,471
1899.												
1....	9,000	2,950	6,300	5,850	9,828	2,288	928	328	228	2,728	1,368	1,328
2....	4,850	3,460	5,750	6,350	8,828	2,288	928	328	228	2,928	1,368	1,328
3....	3,350	4,350	5,170	5,350	8,428	2,078	679	438	228	2,928	2,928	3,208
4....	3,600	3,950	4,650	5,270	8,528	2,078	608	438	228	2,628	5,028	2,448
5....	9,350	3,950	6,920	7,880	5,828	2,078	608	528	228	2,628	6,528	2,628
6....	16,850	4,550	25,700	10,510	5,178	1,538	608	608	228	2,628	6,528	2,908
7....	12,550	3,350	15,110	14,050	2,628	1,538	438	328	228	2,478	8,628	3,578
8....	9,350	2,700	9,770	18,330	2,328	1,538	438	278	228	2,328	9,028	4,548
9....	7,925	2,600	8,450	21,770	2,328	1,378	608	278	228	2,178	7,928	6,078
10....	4,850	2,400	8,350	13,340	2,178	1,378	528	278	228	1,428	4,828	8,328
11....	4,250	2,100	7,000	15,590	2,178	1,128	438	278	228	728	2,778	8,958
12....	3,600	2,850	9,160	18,600	2,428	1,128	438	278	228	728	2,178	10,028
13....	2,850	3,350	20,670	24,040	2,328	928	378	278	228	728	1,578	10,828
14....	3,825	4,750	14,000	29,550	2,078	928	328	278	228	728	1,928	15,828
15....	4,650	4,650	10,950	30,630	1,828	1,038	328	278	228	1,228	2,078	21,358
16....	5,400	3,850	10,050	29,350	2,428	1,038	328	278	278	1,578	1,578	24,228
17....	8,750	3,460	8,350	22,000	1,978	2,928	758	278	278	1,828	1,368	19,128
18....	9,200	2,700	5,750	20,550	1,778	3,528	928	278	278	1,928	1,368	13,128
19....	5,400	2,400	5,470	20,350	1,678	4,628	678	228	278	1,428	1,128	8,128
20....	4,475	2,400	8,250	21,150	4,778	5,128	678	228	278	1,348	1,128	10,228
21....	2,850	2,250	13,560	21,628	6,028	2,628	438	228	278	1,348	1,228	6,328
22....	2,850	2,600	12,600	19,228	6,828	3,228	328	228	278	1,348	1,478	4,928
23....	2,750	5,450	11,400	17,878	6,728	2,168	328	228	278	1,228	1,578	4,578
24....	3,050	10,150	6,460	17,878	5,428	2,168	308	228	278	1,148	1,578	4,578
25....	3,450	5,750	7,050	17,878	4,928	2,078	288	228	278	1,128	1,468	2,428
26....	4,300	5,550	6,740	17,028	4,378	1,538	288	278	3,228	1,028	1,368	2,928
27....	4,475	4,650	5,370	16,428	3,128	1,538	328	278	9,178	828	1,128	2,928
28....	4,950	7,000	4,750	16,428	2,228	1,538	438	238	6,328	728	1,128	2,828
29....	4,750	......	4,650	15,668	1,828	1,428	328	208	1,678	1,228	1,128	2,628
30....	5,575	......	5,560	11,148	2,778	1,538	378	208	2,778	1,348	1,368	2,428
31....	4,850	......	5,170	......	2,778	......	338	208	......	1,348	......	2,228
Mean.	5,739	3,935	9,004	17,057	4,084	2,014	498	294	980	1,608	2,824	7,001

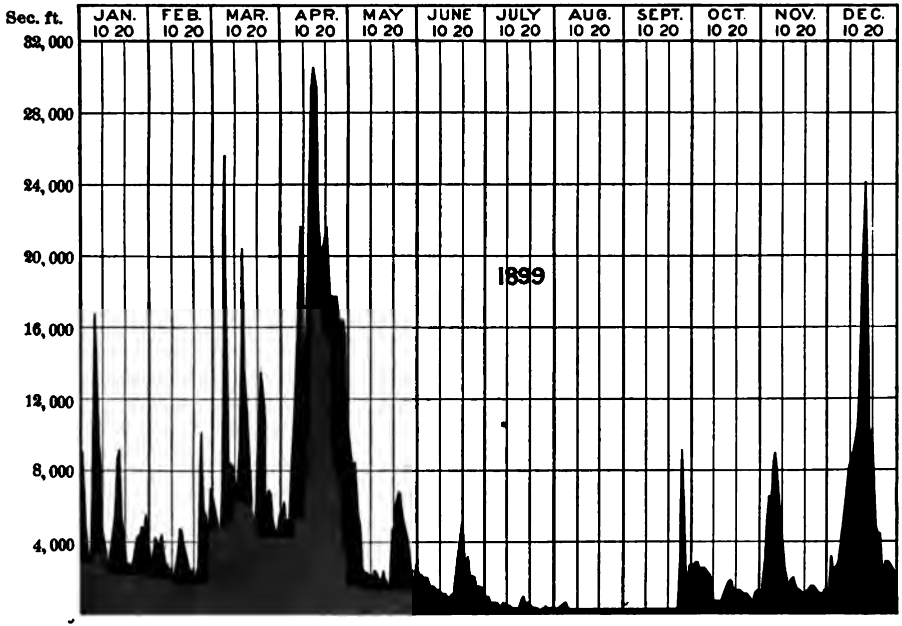
Mean Daily Flow in Second-feet of Mohawk River at Rexford Flats, Saratoga County, N. Y.—(Concluded).

[Drainage area, 3,385 square miles.]

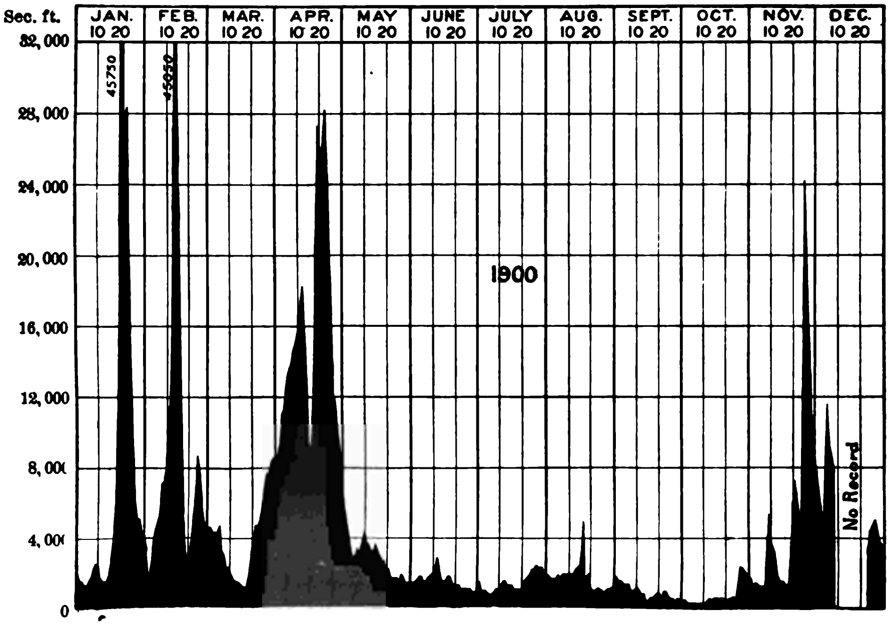
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1....	2,030	2,850	4,650	8,750	5,500	1,470	1,500	1,970	1,920	468	1,545	8,195
2....	1,500	1,860	4,650	9,400	4,800	1,470	940	1,830	1,670	448	1,295	6,286
3....	1,500	2,030	4,450	11,150	4,150	1,580	940	1,720	1,670	348	1,545	5,587
4....	1,260	3,830	4,450	11,400	3,300	1,710	940	1,720	1,540	348	1,495	5,121
5....	1,260	4,450	4,450	12,850	2,850	1,710	820	1,720	1,430	348	1,295	7,711
6....	1,500	4,950	4,800	13,550	3,000	1,470	750	1,970	1,430	348	1,295	11,835
7....	1,860	5,550	3,325	13,850	3,450	1,470	750	1,720	1,430	348	1,295	9,675
8....	2,250	7,150	3,000	14,650	3,300	1,710	820	1,970	1,020	348	1,295	8,921
9....	2,550	7,250	2,250	15,070	3,800	1,710	1,090	1,970	1,020	348	2,395	7,953
10....	2,550	7,950	2,250	15,950	4,400	1,960	1,090	1,970	1,120	348	5,577	......
11....	1,860	10,730	1,860	17,150	3,800	2,240	1,290	1,970	1,220	348	3,865	......
12....	1,610	13,050	1,610	18,300	3,650	2,910	1,500	1,970	1,020	428	3,085	......
13....	1,500	27,250	1,500	15,650	3,300	2,240	1,500	1,970	870	468	2,230	......
14....	1,500	45,050	1,500	13,850	3,300	1,580	1,290	2,250	870	468	1,920	......
15....	1,860	24,850	1,370	9,390	3,800	1,580	1,290	2,390	430	598	1,765	......
16....	2,700	14,850	1,260	9,000	3,300	1,580	1,290	2,470	430	598	1,610	......
17....	3,830	9,650	1,160	12,350	3,000	1,710	1,090	5,020	680	598	1,610	......
18....	6,500	5,750	1,160	20,750	2,850	1,710	1,090	1,830	680	598	1,300	......
19....	10,730	3,150	1,750	27,450	2,700	1,470	1,090	1,830	750	468	1,362	......
20....	21,850	2,470	3,150	25,550	2,250	1,260	1,090	1,970	870	468	2,230	......
21....	45,750	3,830	3,950	26,250	2,250	1,260	1,400	1,070	870	598	6,043	......
22....	27,850	5,150	4,800	28,370	1,750	1,260	1,610	1,070	680	598	7,459	......
23....	28,450	6,690	4,800	26,050	1,650	1,060	1,740	1,070	1,020	698	6,509	......
24....	21,750	8,750	5,150	21,730	1,650	1,060	1,990	1,270	1,020	598	5,577	3,380
25....	13,300	7,850	5,950	17,050	1,650	1,060	2,270	1,170	750	598	5,344	4,550
26....	9,250	6,150	6,900	11,900	1,500	1,060	2,270	1,070	680	2,498	10,205	4,783
27....	6,100	5,150	7,700	11,400	1,900	1,060	2,490	920	680	2,498	24,180	5,016
28....	5,150	4,650	7,700	9,850	1,650	910	2,380	1,000	540	2,348	22,050	4,160
29....	5,150	......	8,430	8,750	1,425	910	2,270	1,000	600	2,198	15,095	3,965
30....	4,450	......	8,550	7,250	1,425	910	2,270	1,070	540	2,098	10,745	3,185
31....	4,250	......	8,750	......	1,425	......	1,990	1,170	......	1,848	......	2,990
Mean.	7,860	9,032	4,235	14,996	2,857	1,503	1,447	1,746	981	784	8,440	6,066
1901.												
1....	3,380	1,360	1,360	9,058	7,082	12,261	1,523	1,657	1,196	856	803	1,672
2....	3,185	996	1,360	8,090	6,849	12,261	1,523	1,440	1,609	856	803	1,672
3....	2,990	906	1,360	8,332	6,849	10,101	1,523	1,298	2,074	856	803	1,672
4....	2,290	870	1,515	15,960	7,082	7,625	1,523	1,244	2,074	856	803	1,672
5....	2,042	780	1,670	19,220	5,484	6,908	1,523	1,154	1,702	856	803	1,672
6....	1,825	870	1,670	20,920	4,985	6,442	1,523	1,154	1,299	856	803	1,982
7....	1,825	906	1,670	26,275	4,752	9,831	4,486	1,244	1,299	856	803	2,168
8....	1,515	1,112	1,515	32,800	4,050	15,581	4,096	1,267	1,299	1,036	803	2,447
9....	1,453	1,205	1,515	23,375	3,660	13,160	3,706	1,267	1,196	1,036	803	2,664
10....	2,445	1,205	1,825	19,220	3,192	11,451	3,121	1,154	1,196	946	803	6,742
11....	3,185	1,205	2,600	15,320	2,802	10,641	2,763	1,154	1,106	856	803	9,935
12....	3,380	1,515	5,016	13,500	7,324	9,077	2,143	1,064	1,106	856	821	8,911
13....	3,263	1,267	5,715	12,600	9,260	7,625	1,771	974	1,454	856	1,001	7,701
14....	2,795	1,205	4,783	12,300	7,566	6,036	1,678	794	2,229	856	1,207	10,745
15....	2,990	1,515	5,016	12,300	7,324	3,992	1,678	794	2,229	1,942	3,163	40,865
16....	3,185	1,515	5,249	12,300	7,451	2,365	1,678	1,064	2,694	4,347	6,043	44,350
17....	3,380	1,670	5,249	11,730	4,985	2,210	1,368	1,595	3,052	5,397	8,185	21,600
18....	3,770	2,290	5,249	11,460	6,150	2,117	1,678	2,122	3,364	3,177	6,975	11,460
19....	3,185	1,825	6,181	10,920	7,566	1,807	1,926	1,502	2,974	2,717	3,553	4,355
20....	2,795	1,670	8,090	10,920	7,808	1,807	1,833	1,244	2,694	2,159	2,447	3,185
21....	2,600	1,825	9,058	12,000	6,849	1,807	1,523	1,244	2,539	1,384	2,261	2,507
22....	2,873	1,670	24,085	10,380	6,383	3,095	1,319	1,244	8,550	1,036	1,672	2,197
23....	2,990	1,515	15,320	33,210	6,383	8,593	1,265	1,244	2,043	946	1,091	2,073
24....	3,185	1,267	15,640	26,650	6,150	9,319	1,085	1,064	1,578	946	1,207	2,414
25....	2,990	1,205	15,960	32,410	5,218	7,625	1,085	1,064	1,578	946	1,982	3,107
26....	2,445	1,050	27,400	30,460	4,985	6,447	995	1,657	1,268	946	2,447	2,678
27....	4,783	1,050	35,670	16,920	5,218	3,797	905	2,277	1,178	946	3,358	2,383
28....	3,575	1,205	28,900	14,700	5,917	2,520	1,265	1,967	1,088	946	2,968	1,887
29....	2,678	......	21,955	9,840	7,566	1,900	1,523	1,502	1,088	856	1,827	1,887
30....	1,670	......	12,600	7,848	8,776	1,652	1,523	1,244	1,088	856	1,672	2,678
31....	......	......	10,650	......	11,122	......	1,771	1,244	......	856	......	3,692
Mean.	2,822	1,299	9,221	16,701	6,348	6,668	1,830	1,320	1,995	1,059	2,090	6,931



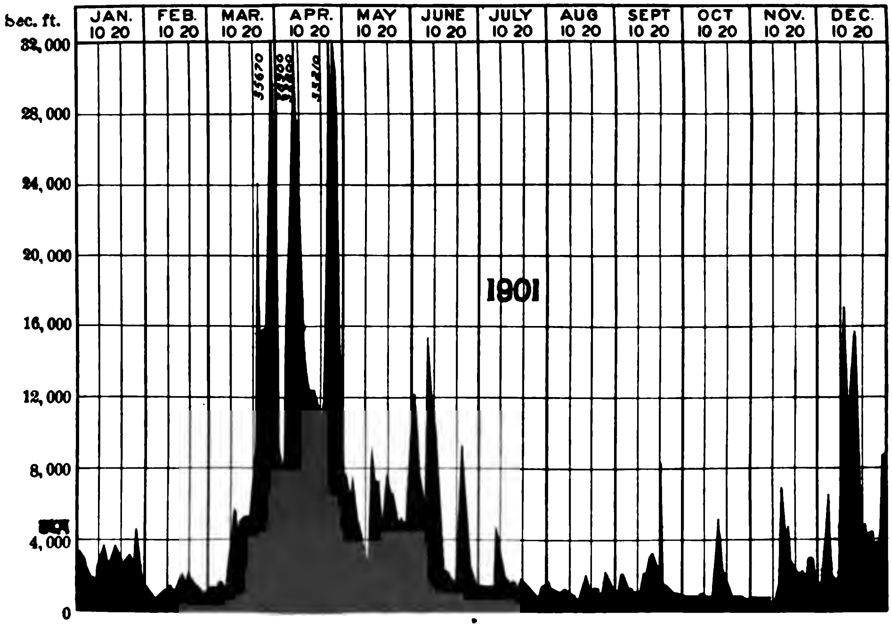
Discharge of Mohawk River at Rexford Flats, Saratoga County, N. Y., 1898.



Discharge of Mohawk River at Rexford Flats, Saratoga County, N. Y., 1899



Discharge of Mohawk River at Rexford Flats, Saratoga County, N. Y., 1900.



Discharge of Mohawk River at Rexford Flats, Saratoga County, N. Y., 1901.

Mean Monthly Run-off of Mohawk River at Rexford Flats, Saratoga County, N. Y.

[Drainage area, 3,385 square miles.]

SECOND-FEET.

MONTH.	1898.	1899.	1900.	1901.
January	......	5,739	7,860	2,822
February	......	3,935	9,032	1,299
March	......	9,004	4,235	9,221
April	......	17,057	14,996	16,701
May	......	4,084	2,857	6,348
June	......	2,014	1,503	6,668
July	......	498	1,447	1,830
August	......	294	1,746	1,320
September	......	980	981	1,995
October	......	1,608	784	1,057
November	......	2,824	8,440	2,090
December	4,471	7,001	6,066	6,931

SECOND-FEET PER SQUARE MILE.

MONTH.	1898.	1899.	1900.	1901.
January	......	1.70	2.32	.83
February	......	1.17	2.67	.38
March	......	2.66	1.25	2.72
April	......	5.04	4.43	4.93
May	......	1.20	.84	1.87
June	......	.59	.44	1.97
July	......	.15	.43	.54
August	......	.09	.51	.39
September	......	.29	.29	.59
October	......	.47	.23	.31
November	......	.83	2.49	.62
December	1.32	2.07	1.79	2.04

INCHES ON DRAINAGE AREA.

MONTH.	1898.	1899.	1900.	1901.
January	......	1.96	2.67	.95
February	......	1.21	2.77	.40
March	......	3.06	1.44	3.14
April	......	5.62	4.94	5.52
May	......	1.38	.96	2.15
June	......	.66	.49	2.21
July	......	.17	.49	.62
August	......	.10	.58	.45
September	......	.32	.32	.66
October	......	.54	.26	.36
November	......	.92	2.79	.69
December	1.52	2.38	2.06	2.35

A record of the area of opening of the gates in the guard-lock at the entrance to the feeder, together with the effective head for the period from November 11, to December 9, 1900, showed the mean daily diversion for the last 20 days of November to be 92 second-feet, and for 9 days of December, to the closing of the canal, 105 second-feet.

The dates of opening and closing the canal feeder, between which the record at Rexford Flats is affected by diversion to the canal, have been as follows:

DATE OPENED.	Date closed.	Days opened.
May 7, 1898	December 10, 1898	217
April 25, 1899	December 1, 1899	220
April 25, 1900	December 1, 1900	220
May 9, 1901	December 15, 1901	220

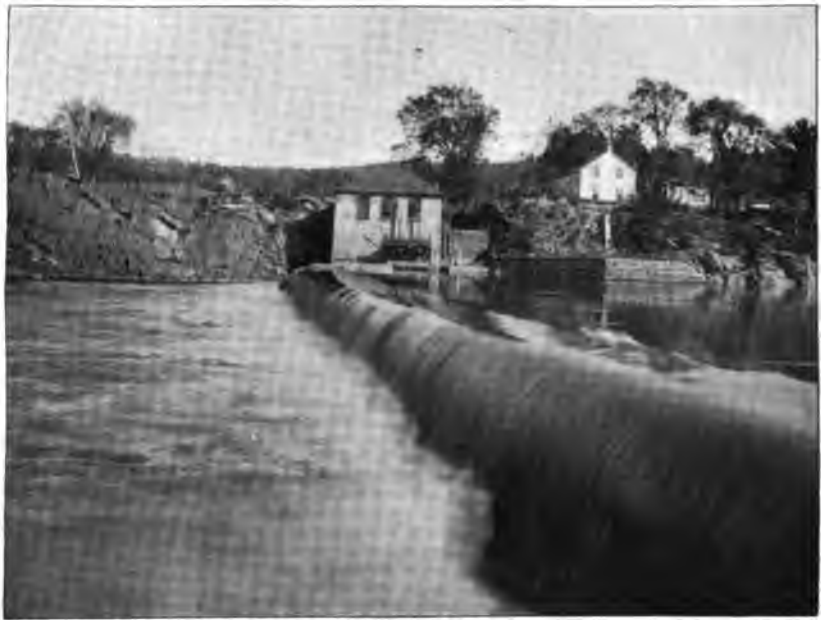
MOHAWK RIVER NEAR DUNSBACH FERRY, SARATOGA COUNTY, N. Y.

This gauging record is kept at the dam of the West Troy Water Company, one-fifth mile above Dunsbach Ferry Bridge, nine miles from the mouth of the river. The dam is in two sections, situated on opposite sides of a Hudson River shale island. The left wing at the upper end of the island has a crest length of 380 feet. The right wing, 500 feet downstream at the foot of the island, has a crest 280 feet long.

The record was established March 12, 1898, for the primary purpose of checking a system of levels for the United States Board of Engineers on Deep Waterways, by D. J. Howell, C. E., who has furnished the earlier portion of the record. No record was kept from April 1, 1899, to August 1, 1900.

The construction of the dam was begun in 1896. The lower wing was not completed until about October 1st, of the summer of 1898. Openings existed in the dam prior to this date, making the computation of the record, from March to September, 1898, impracticable.

In the pumping station adjoining the dam, are two turbines of the old American type, one 66 inches and the other 75 inches in diameter. A current meter measurement of the flow in the headrace leading to the wheel pit, October 17, 1901, showed the turbines to be using 200 second-feet, under an effective head of 6.7 feet. The rated discharge from the manufacturers tables under the same head is 197 second-feet. These turbines usually run 24 hours each day at full gate capacity. In computing the record, the discharge through the water wheels when running



Mohawk River: Dam at Dunsbach Ferry Gauging-Station, Saratoga County, N. Y., 1902.

has been taken constantly equal to 200 second-feet. A new 54-inch Victor turbine has been installed during 1902, replacing one of the old American turbines. The discharge is calculated from the recorded daily run of the water wheels and working head. The turbines drive pumps taking water from the river for water supply purposes at the rate of 1,500,000 gallons per day, equivalent to a continuous flow of 2¼ second-feet. The capacity is being increased.

The dam is of masonry, with a flat granite crest 5.5 feet wide, standing 0.75 feet higher at crest lip than at the upstream edge. The average elevation of the crest of the upper section is 174.15 feet. The crest of the lower section has an elevation varying from 173.46 to 173.50 feet. The crest gauge is attached to the timber cribbing 50 feet above the lower section of the dam, with its zero mark at elevation 172.00 referred to the United States Deep Waterways datum. Gauge readings are taken twice daily at intervals of about 12 hours, by Robert Wilson. The mean of the two daily readings is used in computing the flow. The discharge over the main dam has been calculated by means of the weir formula, using coefficients derived from Cornell University experiments No. 18,[a] representing an experimental cross section almost identical with that of the West Troy Company's dam. When the water rises to a height of 5 feet on the gauge, it begins to flow over the masonry headrace wall at the right hand end of the lower section. This has a broad flat surface of rough masonry. The discharge over this portion has been computed from Cornell University experiment No. 12, on a flat crested dam 6.56 feet wide.

During high water the current of the stream through the cross section of the channel leading to the lower dam has a velocity of several feet per second. The head due to this velocity has been added to the observed head as a correction for velocity of approach to the lower dam. The upper dam is situated 450 feet upstream from the crest gauge. The loss of head from surface slope in this distance as well as the velocity of approach to the upper section of the dam are also corrected for. The elevations of the crest which have been used are those obtained by the United States Deep Waterways Survey. No allowance has been made for leakage of the dam or turbines, which is slight. The drainage area above the Dunsbach Ferry station is 3,440 square miles, or 55 square miles more than at Rexford Flats. Notable high water discharges since the establishment of the record are tabulated below:

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[a] See Transactions, Am. Soc. C. E., Vol. XLIV, pp. 277-283.

DATE.	Gauge height, feet.	Second-feet.	Estimated discharge, second-feet per square mile.
March 14, 1898	8.5	[b]47,000	13.8
November 11, 1898	8.5	47,400	13.8
November 27, 1900	6.6	24,700	7.2
March 27, 1901	7.9	36,200	10.5
April 8, 1901	7.7	34,200	9.9
April 22, 1901	8.9	46,100	13.4
December 16, 1901	9.5	52,400	15.3

[b] Approximate.

The left-hand wing of the dam was injured during highwater of 1902 necessitating a slight change in the discharge calculations. Owing to roughness of the injured crest, etc., the data for 1902 are considered somewhat less precise than formerly. Repairs are in progress.

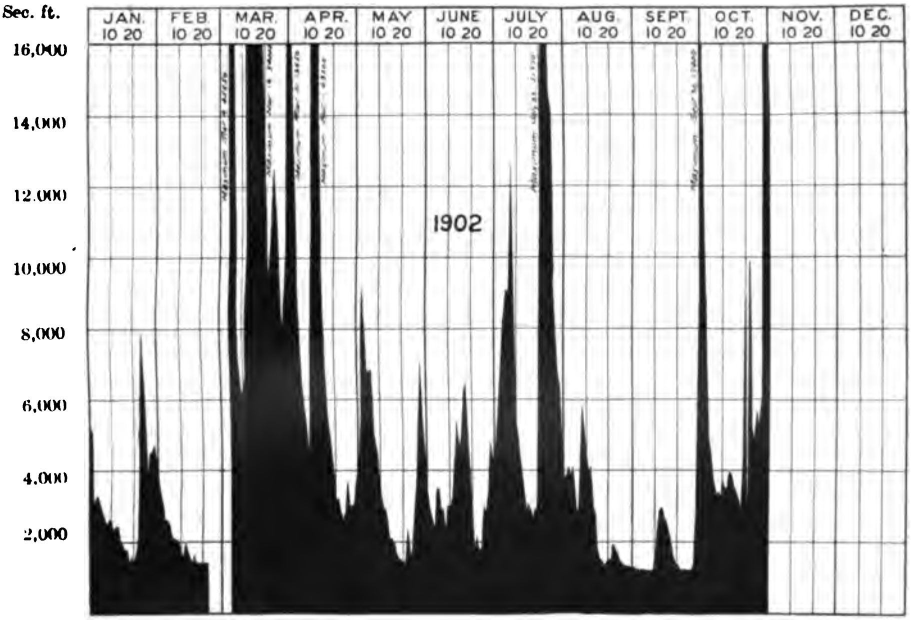
Mean Daily Flow in Second-feet of Mohawk River at Dunsbach Ferry, Saratoga County, N. Y.
[Drainage area, 3,440 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,429	5,788	4,120
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,429	4.920	3.700
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,429	4.120	3.320
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,429	4,120	3.320
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,968	3.320	3.700
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,636	3,320	4,920
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,712	3,320	4,520
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,520	3,320	4,120
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,120	3,700	4,120
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,700	4,520	4.120
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.644	41,200	3.700
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,306	26,420	3.320
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,306	16,440	2,982
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,644	12,602	2,644
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,788	9,764	2,644
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,602	7.660	2,644
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.238	5.788	2.644
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,724	5,788	2,644
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,920	5,788	2,644
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,520	12,024	2,644
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,520	9,238	2,644
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,920	6,724	3.320
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,660	6,256	5,788
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,712	6,724	10.868
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,660	6,724	10,290
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.724	5,320	8,712
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,764	5,320	6.724
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,788	3,320	4 920
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,180	3,320	3.320
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.238	3,320	2,644
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.724	.....	4,120
Mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,321	8,007	4,252
1899.												
1	7,192	1,968	7,660	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	4,920	1,968	6,724	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	4.120	1,968	5,788	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4,520	1,968	4,520	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	4,920	1,968	4,920	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	18,636	1,968	24,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	13,180	1,630	20.100	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	9,764	1,429	12,024	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	7,660	1,027	8,712	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	5,788	1,027	8,186	.....	.....	.....	.....	.....	.....	.....	.....	.....
11	4,120	1,027	6,724	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	4,120	1,027	7,192	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	3,320	1,027	20,100	.....	.....	.....	.....	.....	.....	.....	.....	.....
14	3,700	1,027	17,172	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	5,788	1,027	12,602	.....	.....	.....	.....	.....	.....	.....	.....	.....
16	9,764	1,027	10,290	.....	.....	.....	.....	.....	.....	.....	.....	.....
17	8,712	1,027	9.764	.....	.....	.....	.....	.....	.....	.....	.....	.....
18	7,660	1,228	6,724	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	6,724	1,420	5,788	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	4,920	1,429	8,712	.....	.....	.....	.....	.....	.....	.....	.....	.....
21	4,120	1.968	9,764	.....	.....	.....	.....	.....	.....	.....	.....	.....
22	3,320	3,320	7,660	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	3,320	3,320	6,724	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	3,320	4,920	7,660	.....	.....	.....	.....	.....	.....	.....	.....	.....
25	3,700	10,868	9,764	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	4,120	5.788	7.660	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	4,120	5,320	6,724	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	3,320	6,724	5.788	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	2,644	.....	5,788	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	2,306	.....	5,788	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	2,306	.....	5,320	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean	5,681	6,086	9,261	.....	.....	.....	.....	.....	.....	.....	.....	.....

Mean Daily Flow in Second-feet of Mohawk River at Dunsbach Ferry, Saratoga County, N. Y. — (Continued).

[Drainage area, 3,440 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	....	.....	.....	....	.....	.....	.....	1,228	1,027	625	1,429	6,490
2	....	.....	.....	....	.....	.....	.....	1,027	1,027	625	1,429	6,256
3	....	.....	.....	....	.....	.....	.....	826	826	625	1,429	5,554
4	....	.....	.....	....	.....	.....	.....	625	625	625	1,328	5,320
5	....	.....	.....	....	.....	.....	.....	826	625	625	1,027	12,024
6	....	.....	.....	....	.....	.....	.....	625	457	625	1,207	12,024
7	....	.....	.....	....	.....	.....	.....	625	457	625	926	9,764
8	....	.....	.....	....	.....	.....	.....	541	457	541	1,027	9,764
9	....	.....	.....	....	.....	.....	.....	457	541	457	1,328	8,712
10	....	.....	.....	....	.....	.....	.....	457	625	373	5,554	6,256
11	....	.....	.....	....	.....	.....	.....	457	625	373	3,700	4,320
12	....	.....	.....	....	.....	.....	.....	457	1,027	457	2,982	3,320
13	....	.....	.....	....	.....	.....	.....	457	373	457	2,475	4,320
14	....	.....	.....	....	.....	.....	.....	541	373	457	1,799	4,120
15	....	.....	.....	....	.....	.....	.....	1,027	373	541	1,630	3,700
16	....	.....	.....	....	.....	.....	.....	2,644	373	541	1,630	3,151
17	....	.....	.....	....	.....	.....	.....	2,306	457	1,027	1,529	2,813
18	....	.....	.....	....	.....	.....	.....	1,968	457	1,027	1,328	2,644
19	....	.....	.....	....	.....	.....	.....	1,429	289	1,027	1,429	2,982
20	....	.....	.....	....	.....	.....	.....	1,228	289	1,027	1,630	2,982
21	....	.....	.....	....	.....	.....	.....	1,027	373	926	5,320	2,813
22	....	.....	.....	....	.....	.....	.....	1,027	457	625	7,660	2,644
23	....	.....	.....	....	.....	.....	.....	625	625	625	6,724	2,982
24	....	.....	.....	....	.....	.....	.....	625	1,630	625	5,120	2,982
25	....	.....	.....	....	.....	.....	.....	625	1,429	625	4,520	4,720
26	....	.....	.....	....	.....	.....	.....	1,027	1,027	2,475	8,186	8,975
27	....	.....	.....	....	.....	.....	.....	1,027	1,027	2,475	23,900	6,490
28	....	.....	.....	....	.....	.....	.....	826	1,027	1,759	22,760	5,554
29	....	.....	.....	....	.....	.....	.....	625	625	1,529	16,440	4,720
30	....	.....	.....	....	.....	.....	.....	625	625	1,630	10,290	4,120
31	....	.....	.....	....	.....	.....	.....	1,027	....	1,429	.....	3,700
Mean	....	.....	.....	....	.....	.....	.....	930	672	885	4,922	5,362
1901.												
1	2,951	1,630	826	10,027	7,400	9,301	1,630	1,228	1,027	1,328	1,228	1,429
2	2,951	1,429	926	7,923	7,226	10,027	1,429	926	1,429	1,529	1,027	1,429
3	2,275	1,799	1,027	8,775	6,392	10,868	1,429	1,127	2,644	1,968	1,027	1,799
4	1,937	1,529	1,027	16,972	6,524	10,290	1,328	1,328	3,320	1,529	1,027	2,306
5	1,329	1,429	1,328	19,534	5,120	8,712	1,228	1,127	2,813	1,630	1,027	3,520
6	1,768	1,228	1,529	19,900	4,120	6,724	1,429	926	2,475	1,630	1,027	3,700
7	2,106	1,127	1,529	22,560	3,120	10,027	3,700	1,228	1,968	1,129	926	2,644
8	1,768	926	1,529	32,700	3,120	17,536	3,520	1,228	1,429	1,429	625	1,968
9	2,106	1,228	1,529	23,700	2,782	13,180	3,151	1,328	1,127	1,228	926	2,306
10	2,644	1,127	1,429	19,900	2,444	10,027	2,306	1,799	1,027	1,228	926	2,475
11	3,320	1,228	1,630	15,914	3,120	7,923	1,968	1,799	1,027	1,228	1,027	11,735
12	4,120	1,127	4,920	13,632	8,249	5,554	1,968	2,044	1,228	1,228	1,027	10,290
13	3,700	1,127	5,554	13,306	11,535	4,720	1,968	2,475	1,228	1,027	1,429	8,975
14	3,700	926	4,920	12,691	10,668	3,920	1,630	1,968	1,630	1,799	5,320	10,290
15	3,320	826	4,520	13,306	8,249	3,151	1,529	1,630	1,968	3,700	5,554	38,500
16	3,151	1,027	4,920	13,632	6,290	2,813	1,228	1,630	1,968	6,022	4,120	46,080
17	2,644	1,027	5,320	12,691	4,920	2,644	1,328	1,630	2,475	4,120	2,982	25,800
18	2,982	1,027	5,120	12,402	5,120	2,137	1,630	1,630	3,151	3,520	2,644	12,980
19	4,320	1,027	6,022	12,402	7,226	1,968	1,630	1,529	2,644	4,320	2,644	10,379
20	3,320	1,027	7,660	11,824	7,986	1,968	1,799	1,228	2,137	3,151	2,644	10,379
21	2,137	1,228	10,027	13,958	8,249	1,630	1,630	826	1,799	2,982	2,175	4,120
22	1,630	1,027	25,100	45,060	6,758	3,520	1,529	1,529	1,630	2,644	2,306	2,613
23	2,137	1,027	16,114	33,240	6,056	6,490	1,328	2,644	1,429	2,306	1,968	3,320
24	3,520	1,027	16,440	27,900	6,524	9,764	1,127	1,630	1,228	1,799	1,968	3,151
25	2,982	1,027	16,440	30,100	6,524	7,660	926	1,968	926	1,799	2,137	3,700
26	2,475	1,027	24,700	30,100	6,290	6,022	826	2,813	826	1,529	2,813	3,520
27	1,799	826	33,440	17,704	5,120	3,520	826	2,137	926	1,529	2,644	3,520
28	1,630	826	31,180	12,402	6,056	2,813	826	1,529	725	1,228	1,799	2,982
29	1,529	.....	23,140	9,827	10,668	2,306	1,328	1,328	926	1,127	1,429	3,151
30	1,799	.....	14,480	8,249	10,379	1,799	1,228	1,127	1,027	1,027	1,429	3,700
31	1,529	.....	12,024	....	10,370	.....	1,228	1,027	.....	1,027	.....	6,958
Mean	2,567	1,141	9,332	18,068	6,622	6,300	1,633	1,580	1,672	2,066	2,004	8,055



Discharge of Mohawk River at Dunsbach Ferry, Saratoga County, N. Y., 1902.

Mean Daily Flow in Second-feet of Mohawk River at Dunsbach Ferry, Saratoga County, N. Y.—(Concluded.)
[Drainage rea, 3,440 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1........	5,120	3,330	*a*	15,700	5,840	2,950	5,450	3,825	1,250	12,050	9,950	6,300
2........	3,151	3,151	*a*	12,325	9,100	2,650	6,500	4,125	1,250	8,400	6,975	5,870
3........	3,151	2,644	*a*	9,600	8,475	2,350	7,850	3,825	1,200	6,500	5,675	5,870
4........	3,320	2,614	45,550	8,375	6,750	3,500	8,375	4,125	1,250	4,850	4,700	7,670
5........	2,982	2,544	25,150	6,500	6,925	3,500	9,100	3,225	1,200	4,300	4,525	12,100
6........	2,813	2,206	17,550	5,650	6,925	2,925	9,100	2,500	1,200	3,675	4,025	10,200
7........	2,614	2,106	12,350	5,200	4,850	2,925	12,750	3,825	1,200	3,300	3,875	7,200
8........	2,475	2,106	7,150	4,470	4,470	2,350	9,900	5,840	1,225	3,400	3,725	5,100
9........	2,644	2,037	6,250	8,100	3,950	3,050	7,150	5,225	1,275	3,250	3,725	3,880
10........	2,644	1,768	6,250	16,425	3,350	2,925	5,225	4,470	1,545	3,725	3,575	3,100
11........	2,306	1,599	6,700	23,200	3,050	3,225	4,470	3,975	2,350	3,550	3,070	3,730
12........	2,475	1,868	9,900	20,300	2,925	4,300	3,975	4,125	2,950	3,550	3,070	4,120
13........	2,475	1,699	34,000	13,800	2,650	5,450	3,500	3,025	2,950	4,025	4,025	4,300
14........	2,137	1,530	34,000	9,625	2,100	4,650	2,925	2,800	2,650	3,900	5,475	4,530
15........	1,968	1,429	23,450	7,625	2,100	5,025	3,050	1,825	2,500	3,550	6,300	4,900
16........	1,799	1,630	20,700	5,225	1,950	6,050	2,925	1,545	2,250	3,400	5,100	5,280
17........	1,799	1,429	28,450	5,040	1,675	6,500	2,650	1,475	1,950	3,250	4,175	9,150
18........	1,429	1,429	32,350	4,470	1,545	4,850	2,925	1,350	1,545	2,850	4,025	19,700
19........	1,630	1,429	23,260	3,825	1,475	4,125	2,925	1,400	1,400	4,520	4,025	16,710
20........	1,429	1,429	14,105	3,200	1,400	3,200	6,500	1,450	1,325	8,930	4,175	14,530
21........	1,630	1,429	10,400	3,200	1,545	1,725	15,700	1,475	1,250	1,495	3,725	12,950
22........	2,137	1,429	9,350	2,780	2,350	2,225	21,775	1,950	1,200	9,950	3,725	16,450
23........	6,022	*a*	11,050	2,650	1,675	1,825	19,200	1,825	1,200	5,275	3,400	29,350
24........	7,923	*a*	12,650	2,780	1,825	1,825	14,700	1,675	1,200	4,900	3,250	22,950
25........	6,022	*a*	11,500	2,675	2,800	3,050	14,125	1,475	1,200	5,700	3,100	11,200
26........	3,720	*a*	10,150	3,050	3,825	2,800	9,100	1,400	1,200	5,275	4,010	7,150
27........	4,520	*a*	9,100	3,050	5,450	3,350	7,850	1,350	1,350	6,000	4,900	7,150
28........	4,520	*a*	7,850	3,050	7,150	4,850	6,925	1,350	2,650	15,750	7,200	5,100
29........	4,720	.....	9,650	3,825	5,250	4,350	6,500	1,300	8,475	28,150	8,650	3,750
30........	4,320	.....	17,100	4,125	4,300	4,125	4,850	1,300	17,400	18,200	7,000	4,730
31........	3,920	.....	19,650	.....	3,400	.....	3,825	1,300	.....	14,775	.....	5,100
Mean...	3,253	1,948	16,986	7,361	3,906	3,554	4,251	2,592	2,386	6,466	4,771	9,036

a No record.

Mean Monthly Run-off of Mohawk River at Dunsbach Ferry, Saratoga County, N. Y.
[Drainage area, 3,440 square miles.]

SECOND-FEET.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	5,681	......	2,567	3,253
February....................	......	6,068	......	1,141	1,948
March.......................	......	9,261	......	9,332	*a*16,986
April.......................	......	......	......	18,068	7,361
May.........................	......	......	......	6,622	3,906
June........................	......	......	......	6,300	3,554
July	......	......	......	1,633	4,251
August......................	......	......	930	1,580	2,592
September...................	......	......	672	1,672	2,386
October.....................	6,321	......	885	2,066	6,466
November....................	8,007	......	4,922	2,004	4,771
December....................	4,252	......	5,362	8,055	9,036

(*a*) Record incomplete; flow for days of maximum discharge not available.

SECOND-FEET PER SQUARE MILE.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	1.65	......	.75	0.95
February....................	......	1.77	......	.33	0.57
March.......................	......	2.69	......	2.72	4.94
April.......................	......	......	......	5.26	2.14
May.........................	......	......	......	1.93	1.14
June........................	......	......	......	1.83	1.03
July........................	......	......	......	.47	1.24
August......................	......	......	.27	.46	0.75
September...................	......	......	.20	.49	0.69
October.....................	1.83	......	.26	.60	1.88
November....................	2.33	......	1.43	.58	1.39
December....................	1.24	......	1.56	2.42	2.63

INCHES ON DRAINAGE AREA.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	......	1.90	......	.86	1.09
February	......	1.84	......	.34	0.59
March	......	3.09	......	3.13	5.68
April	......	......	......	5.89	2.39
May	......	......	......	2.22	1.31
June	......	......	......	2.05	1.15
July	......	......	......	.54	1.43
August	......	......	.31	.53	0.86
September	......	......	.22	.55	0.77
October	2.10	......	.30	.69	2.17
November	2.60	......	1.60	.65	1.59
December	1.43	......	1.79	2.79	3.03

MOHAWK RIVER SLOPE GAUGINGS.

A series of gauging stations were established at various points on Mohawk River in 1900 with a view to determining the maximum high water discharge and the downward progress of floods from the cross section and surface slope. These stations were established under the direction of the State Engineer and Surveyor, in connection with the Barge Canal Survey, by D. J. Howell, M. Am. Soc. C. E., consulting engineer. Gauging stations previously maintained by the United States Geological Survey were utilized as far as possible. On the completion of the investigation of the Barge Canal Survey, the gauge readings at the several stations were continued in connection with the measurement of the volume of streams.

A gauge board was erected at each of the principal points of change of slope, whether occasioned by a dam or by the entrance of a large tributary. The stretch of the river extending between each two successive gauges constitutes a slope section. The gauge boards have been numbered consecutively from 1 to 24, beginning at the mouth of the stream. The elevations of the zero marks of the gauges were determined by a line of precise levels, by Wm. B. Landreth, M. Am. Soc. C. E., Resident Engineer Barge Canal Survey, referred to the Greenbush bench mark = 14.73 as a datum.

Mean Daily Elevation of Water Surface of Mohawk River at Cohoes Co.'s Dam, Albany County, N. Y., Gauge No. 1.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	154.6	156.0	155.2	154.6	154.1	156.0
2	......	154.7	156.0	155.1	154.6	154.5	155.9
3	......	154.9	155.6	155.0	155.0	154.7	155.9
4	......	155.0	155.6	154.9	154.4	154.3	156.9
5	......	154.6	156.3	154.9	154.3	154.7	157.0
6	......	154.6	156.5	154.9	154.2	154.8	157.2
7	......	154.4	156.1	154.9	154.2	154.9	157.5
8	......	154.3	156.0	154.8	153.7	154.9	158.3
9	......	154.8	156.1	154.9	154.2	154.9	157.6
10	......	155.4	156.1	155.0	155.1	155.0	157.2
11	......	155.8	155.4	155.1	154.0	155.4	156.7
12	......	155.3	155.5	155.3	153.5	155.4	156.5
13	......	155.1	155.5	155.3	153.5	155.4	156.5
14	......	155.0	155.4	155.2	153.5	155.4	156.6
15	......	154.8	155.3	155.1	153.5	155.4	156.5
16	......	154.8	155.2	155.0	153.5	155.5	156.5
17	......	154.9	155.0	155.0	155.0	155.6	156.4
18	......	155.0	155.0	154.9	154.0	155.5	156.4
19	......	154.7	155.0	155.0	153.5	155.5	156.4
20	......	154.8	155.0	155.2	153.5	155.8	156.3
21	......	155.5	155.0	155.0	153.5	156.4	156.8
22	......	155.9	155.3	155.0	153.5	156.9	159.3
23	153.5	155.8	155.3	155.0	154.0	156.9	158.2
24	154.0	155.7	155.4	155.1	154.9	156.8	157.9
25	153.5	155.6	155.8	155.0	154.3	156.8	158.2
26	155.0	156.2	156.0	155.0	154.2	157.4	158.3
27	155.2	157.6	155.7	155.0	154.0	158.2	157.0
28	155.1	157.5	155.6	154.7	154.1	158.1	......
29	154.7	157.0	155.4	154.7	......	157.4	......
30	154.9	156.4	155.4	155.0	......	156.4	......
31	154.8	......	155.3	154.8	......	156.3	......

Mean Daily Elevation of Water Surface of Mohawk River Below West Troy Co.'s Dam, Dunsbach Ferry, Saratoga County, N. Y., Gauge No. 2.

DAY.	1900.			1901.				
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1	......	165.7	167.7	166.4	165.7	165.4	165.9	166.4
2	......	165.7	167.2	166.4	165.7	165.4	166.9	......
3	......	165.7	167.1	166.1	165.6	165.4	167.8	......
4	......	165.7	167.0	165.9	165.6	165.4	165.2	......
5	......	165.6	168.4	165.9	165.6	165.6	166.5	......
6	......	165.5	168.6	165.8	165.6	165.7	167.0	......
7	......	165.4	168.0	166.0	165.5	165.7	166.6	......
8	......	165.5	167.9	165.7	165.5	165.7	165.4	......
9	......	166.1	167.7	165.7	165.7	165.7	166.3	......
10	......	167.1	167.3	166.0	165.5	165.7	166.9	......
11	......	166.7	167.0	166.4	165.6	166.3	166.2	......
12	......	166.3	166.9	166.5	165.6	166.7	165.1	......
13	......	166.1	167.1	166.4	165.6	166.9	165.1	......
14	......	166.0	166.7	166.3	165.5	166.7	165.2	......
15	......	165.9	166.4	166.3	165.5	166.6	165.2	......
16	......	165.9	166.2	166.2	165.5	166.7	165.2	......
17	......	165.8	166.1	166.2	165.6	166.8	165.1	......
18	......	165.7	166.1	166.3	165.6	166.8	165.2	......
19	......	165.7	166.2	166.5	165.5	167.2	165.2	......
20	......	165.8	166.2	166.4	165.5	167.7	165.2	......
21	165.3	166.9	166.2	166.0	165.6	166.0	165.0	......
22	165.3	167.5	166.2	165.8	165.5	......	......	......
23	165.3	167.3	166.3	166.0	165.5	......	......	......
24	165.3	167.1	166.3	166.3	165.5	......	165.2	......
25	165.3	166.8	166.8	166.1	165.5	......	165.2	......
26	166.2	167.7	167.9	166.0	165.5	......	165.4	......
27	166.1	170.8	167.4	165.9	165.4	......	167.5	......
28	165.9	170.4	167.2	165.8	165.4	......	165.4	......
29	165.8	169.3	166.7	165.8	......	166.5	165.7	......
30	165.8	168.3	166.5	165.8	......	165.1	166.3	......
31	165.8	......	166.3	165.7	......	165.5	......	......

Mean Daily Elevation of Water Surface of Mohawk River Above West Troy Co.'s Dam, Dunsbach Ferry, Saratoga County, N. Y., Gauge No. 3.

DAY.	1900.			1901.				
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1.	......	174.6	176.0	175.2	174.7	174.3	176.7	176.2
2.	......	174.6	175.9	175.2	174.6	174.4	176.3	......
3.	......	174.6	175.8	175.0	174.8	174.4	176.5	......
4.	......	174.6	175.7	174.9	174.7	174.4	177.8	......
5.	......	174.5	177.0	174.7	174.6	174.6	178.2	......
6.	......	174.4	177.0	174.8	174.5	174.7	178.2	......
7.	......	174.4	176.6	174.9	174.5	174.7	178.6	......
8.	......	174.4	176.6	174.8	174.4	174.7	179.7	......
9.	......	174.6	176.4	174.9	174.5	174.7	178.7	......
10.	......	175.8	175.9	175.0	174.5	174.6	178.2	......
11.	......	175.3	175.5	175.2	174.5	174.7	177.7	......
12.	......	175.1	175.2	175.4	174.5	175.6	177.3	......
13.	......	175.0	175.5	175.3	174.5	175.8	177.3	......
14.	......	174.8	175.4	175.3	174.4	175.6	177.2	......
15.	......	174.7	175.3	175.2	174.3	175.5	177.3	......
16.	......	174.7	175.2	175.2	174.4	175.6	177.3	......
17.	......	174.7	175.1	175.0	174.4	175.7	177.2	......
18.	......	174.6	175.0	175.1	174.4	175.7	177.1	......
19.	......	174.6	175.1	175.5	174.4	175.9	177.1	......
20.	......	174.7	175.1	175.3	174.5	176.2	177.0	......
21.	174.4	175.7	175.1	174.9	174.5	176.7	177.4	......
22.	174.3	176.2	175.0	174.7	174.4	179.2	181.0	......
23.	174.3	176.0	175.1	174.9	174.4	177.7	179.8	......
24.	174.3	175.7	175.1	175.3	174.4	177.7	179.2	......
25.	174.3	175.5	175.6	175.1	174.4	177.7	179.5	......
26.	175.0	176.3	176.5	175.0	174.4	178.8	170.5	......
27.	175.0	178.7	176.0	174.8	174.3	179.8	177.9	......
28.	174.8	178.6	175.8	174.7	174.3	179.6	177.1	......
29.	174.7	177.7	175.6	174.7	......	178.6	176.7	......
30.	174.7	176.7	175.4	174.8	......	177.4	176.4	......
31.	174.6	......	175.3	174.7	......	177.0	......	......

Mean Daily Elevation of Water Surface of Mohawk River at Vischer's Ferry, Saratoga County N. Y., Gauge No. 4.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1.	......	174.6	177.1	177.5	176.4	175.7	177.5
2.	......	174.6	176.6	177.7	176.3	175.7	177.0
3.	......	174.6	176.2	178.0	176.1	175.6	177.2
4.	......	174.6	176.1	177.6	176.1	175.7	179.5
5.	......	174.3	178.1	177.3	176.0	175.7	180.2
6.	......	174.3	178.2	177.2	176.0	175.8	180.3
7.	......	174.2	177.5	177.3	175.9	175.9	181.0
8.	......	174.2	177.3	177.2	175.8	176.0	183.2
9.	......	175.0	177.0	177.5	176.0	175.9	181.2
10.	......	176.1	177.0	177.5	176.1	175.9	180.3
11.	......	175.7	177.6	177.9	175.8	176.6	179.3
12.	......	175.3	177.3	178.0	176.1	177.5	180.2
13.	......	175.0	178.0	177.8	175.9	177.6	178.6
14.	......	174.9	178.0	177.8	175.9	177.2	178.6
15.	......	174.9	177.8	177.7	175.8	177.2	178.6
16.	......	174.8	178.1	177.6	175.9	177.4	178.7
17.	......	174.7	177.7	177.6	175.9	177.3	178.4
18.	......	174.6	177.7	177.5	175.9	177.4	178.3
19.	......	174.6	177.7	177.5	175.8	177.7	178.4
20.	......	174.8	177.7	177.5	175.7	178.4	178.3
21.	......	176.1	177.8	177.0	175.9	178.7	178.9
22.	......	176.7	177.7	176.9	175.9	182.2	186.5
23.	174.2	176.5	177.7	177.0	175.8	179.6	183.4
24.	174.2	176.1	177.7	177.4	175.7	179.5	182.2
25.	174.2	175.9	178.4	177.3	175.7	179.5	182.5
26.	175.1	177.1	179.5	177.0	175.7	181.6	182.7
27.	175.2	181.0	178.8	177.0	175.7	183.5	179.7
28.	174.8	180.8	178.5	176.5	175.3	182.9	178.4
29.	174.6	179.5	178.0	176.4	......	180.9	177.6
30.	174.6	177.9	178.0	176.5	......	178.8	177.1
31.	174.6	......	177.6	176.4	......	178.1	......

Mean Daily Elevation of Water Surface of Mohawk River at Rexford Flats, Saratoga County, N. Y. Gauge No. 5, Below Dam.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	204.0	205.5	204.9	204.6	204.5	207.5
2	......	204.2	205.4	204.8	204.6	204.5	207.7
3	......	204.1	205.4	204.8	204.5	204.5	207.8
4	......	204.1	205.2	204.7	204.5	204.5	206.8
5	......	204.0	206.1	204.6	204.4	204.6	207.0
6	......	204.0	206.0	204.6	204.4	204.5	207.1
7	......	204.0	205.8	204.6	204.4	204.5	211.1
8	......	204.1	205.7	204.4	204.4	204.6	210.2
9	......	205.0	205.6	204.4	204.6	204.6	211.5
10	......	205.5	......	204.7	204.5	204.6	212.2
11	......	205.2	......	204.8	204.5	204.8	212.8
12	......	204.9	......	204.9	204.5	205.5	213.1
13	......	204.8	......	204.8	204.5	205.6	213.2
14	......	204.6	......	204.8	204.5	205.2	206.1
15	......	204.6	......	204.8	204.5	205.2	206.0
16	......	204.6	......	204.7	204.5	205.3	205.9
17	......	204.6	......	204.8	204.5	205.3	205.7
18	......	204.5	......	204.9	204.5	205.3	205.6
19	......	204.6	......	204.8	204.5	205.5	205.5
20	......	204.8	......	204.8	204.5	205.9	205.5
21	204.2	205.5	......	204.8	204.5	206.1	206.0
22	204.2	205.7	......	204.8	204.5	208.3	214.7
23	204.2	205.6	......	204.8	204.5	206.7	212.5
24	204.2	205.3	204.7	205.0	204.4	206.5	212.0
25	204.1	205.3	204.8	204.9	204.3	206.6	212.6
26	205.0	206.0	204.9	204.8	204.3	209.3	210.8
27	204.9	208.8	204.8	205.4	204.3	......	208.4
28	204.6	208.1	204.7	205.2	204.3	210.3	207.6
29	204.3	206.8	204.7	205.1	......	208.3	207.1
30	204.2	205.9	204.8	204.7	......	207.0	206.8
31	204.1	......	204.8	204.6	......	207.1	......

Mean Daily Elevation of Water Surface of Mohawk River Above State Dam at Rexford Flats, Saratoga County, N. Y., Gauge No. 6.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	208.9	209.3	210.9	209.9	209.3	209.3	211.1
2	208.8	209.2	210.6	209.8	209.2	209.3	210.9
3	208.8	209.3	210.4	209.8	209.2	209.3	211.0
4	208.8	209.3	210.3	209.6	209.2	209.3	212.4
5	208.8	209.2	210.8	209.5	209.1	209.4	212.8
6	208.8	209.2	211.5	209.4	209.1	209.4	213.0
7	208.8	209.2	211.2	209.4	209.1	209.3	213.8
8	208.8	209.2	211.0	209.3	209.3	209.3	214.6
9	208.8	209.9	210.8	209.4	209.4	209.3	213.3
10	208.8	210.4	......	209.6	209.2	209.4	212.8
11	208.8	210.0	......	209.7	209.2	209.6	212.2
12	208.8	209.8	......	209.8	209.3	210.3	212.0
13	208.9	209.6	......	209.8	209.3	210.4	211.7
14	208.9	209.5	......	209.7	209.3	210.2	211.7
15	209.0	209.3	......	209.7	209.4	210.2	211.7
16	209.0	209.4	......	209.8	209.4	210.3	211.7
17	209.0	209.4	......	209.9	209.4	210.3	211.6
18	209.0	209.2	......	210.0	209.6	210.3	211.6
19	208.9	209.3	......	209.9	209.5	210.5	211.5
20	208.9	209.5	......	209.8	209.4	210.9	211.5
21	209.0	210.5	......	209.7	209.5	211.1	211.8
22	209.0	210.8	......	209.8	209.4	213.4	216.4
23	209.0	210.6	......	209.7	209.5	212.2	214.7
24	209.0	210.3	210.0	209.8	209.3	212.3	213.9
25	209.0	210.3	210.2	209.8	209.2	212.3	214.6
26	209.8	211.3	210.4	209.6	209.2	213.9	214.4
27	209.8	213.4	210.3	210.3	209.2	215.0	212.4
28	209.7	213.2	210.2	210.3	209.2	214.2	211.5
29	209.6	212.2	210.1	209.6	......	213.0	211.2
30	209.5	211.4	209.8	209.3	......	211.8	210.8
31	209.4	......	209.8	209.2	......	211.4	......

Mean Daily Elevation of Water Surface of Mohawk River at Schenectady, Schenectady County, N. Y., Gauge No. 8.

DAY.	1900.			1901.						
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	209.0	209.3	211.6	210.1	209.7	209.4	212.0	211.5	211.7	209.3
2	209.0	209.4	211.1	210.1	209.5	209.3	211.5	211.2	211.9	209.3
3	209.0	209.3	210.8	209.8	209.4	209.3	211.5	211.1	212.2	209.3
4	209.0	209.3	210.5	209.6	209.4	209.3	213.8	211.0	212.0	200.2
5	209.0	209.2	212.5	209.9	209.4	209.4	214.4	210.6	211.6	209.2
6	209.0	209.2	212.6	209.6	209.3	209.5	214.5	210.3	211.1	209.3
7	208.8	209.1	211.9	209.5	209.3	209.5	215.3	210.0	212.2	210.2
8	208.9	209.1	211.8	209.7	209.3	209.5	217.7	209.9	213.9	210.1
9	208.9	210.2	211.5	209.6	209.4	209.4	215.3	209.8	212.6	209.9
10	208.9	210.8	211.0	209.7	209.4	209.5	214.5	209.7	211.9	209.6
11	208.9	210.4	210.5	210.1	209.3	210.1	213.6	210.0	211.3	209.5
12	208.9	209.9	209.9	210.2	209.5	210.8	213.0	211.5	210.7	209.5
13	208.9	209.6	210.5	210.4	209.4	211.3	212.8	212.3	210.4	209.4
14	209.0	209.6	210.6	210.1	209.4	210.8	212.8	212.2	210.1	209.4
15	208.9	209.5	210.0	210.0	209.4	210.7	212.8	211.5	210.0	209.3
16	208.9	209.5	209.8	209.9	209.3	210.9	212.9	210.9	209.8	209.2
17	209.0	209.4	209.6	209.9	209.5	210.9	212.7	210.5	209.6	209.2
18	209.0	209.3	209.7	210.1	209.4	211.8	212.6	211.4	209.5	209.3
19	209.2	209.4	209.7	210.0	209.3	211.1	212.7	211.2	209.4	209.5
20	209.1	209.6	209.8	209.8	209.4	211.7	212.5	211.4	209.4	209.4
21	209.0	210.7	209.9	210.2	209.4	212.1	212.8	211.4	209.4	......
22	209.0	211.4	210.0	209.7	209.5	216.2	220.4	211.0	210.1	......
23	209.0	211.1	209.9	209.7	209.4	214.6	217.3	210.7	211.5	......
24	209.0	210.8	209.9	210.0	209.3	213.8	216.3	211.0	211.8	......
25	209.0	210.5	210.5	209.9	209.3	213.7	217.0	211.0	211.3	......
26	209.9	212.2	211.8	209.8	209.3	216.0	217.0	210.8	210.9	......
27	209.8	215.4	211.4	209.7	209.2	217.3	213.8	210.5	210.0	......
28	209.5	215.1	210.8	210.5	209.3	217.2	212.6	210.6	209.7	......
29	209.4	213.8	210.5	210.2	......	215.3	211.9	212.0	209.5	......
30	209.5	212.3	210.2	209.4	......	213.3	211.5	211.9	209.4	......
31	209.4	......	210.0	209.7	......	212.4	......	212.1	......	......

Mean Daily Elevation of Water Surface of Mohawk River at Hoffman's Ferry, Schenectady County, N. Y., Gauge No. 9.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	235.3	239.4	237.1	235.8	235.5	239.8
2	......	235.5	238.7	236.8	235.7	235.4	239.0
3	......	235.4	238.3	236.4	235.7	235.4	240.0
4	......	235.1	238.0	235.9	235.6	235.5	242.1
5	......	235.0	241.6	235.8	235.5	235.7	243.3
6	......	234.8	240.7	236.2	235.8	236.3	243.2
7	......	234.8	240.1	236.1	235.9	236.3	244.8
8	......	235.0	239.9	236.0	236.1	236.0	245.8
9	......	238.1	238.4	236.2	236.1	235.8	244.0
10	......	238.1	238.3	236.4	236.2	236.4	242.9
11	......	237.2	237.5	237.4	236.3	237.7	241.9
12	......	236.5	237.2	237.4	235.9	238.9	241.5
13	......	236.1	237.3	237.2	236.2	238.9	241.1
14	......	235.9	237.3	237.2	236.7	238.3	241.3
15	......	235.9	237.8	236.9	236.4	238.2	241.4
16	......	235.7	238.6	236.7	236.5	238.9	241.3
17	......	235.4	238.2	236.6	235.9	239.1	241.0
18	......	235.3	238.0	236.6	235.7	238.5	240.9
19	......	235.4	238.0	236.6	235.7	239.9	241.0
20	......	236.5	238.2	236.6	235.6	240.5	240.8
21	......	239.1	238.3	236.3	235.7	241.1	242.4
22	......	239.1	238.1	236.2	235.6	245.2	243.8
23	......	238.7	237.7	237.0	235.6	241.7	246.7
24	234.4	238.0	237.5	236.9	235.7	242.1	244.9
25	235.3	237.5	240.7	236.6	235.6	242.0	246.6
26	236.7	241.6	239.9	236.2	235.3	245.2	244.6
27	236.1	244.7	239.4	236.0	235.6	246.8	242.2
28	235.5	244.0	238.4	236.0	235.6	245.7	240.5
29	235.6	241.8	237.8	235.9	......	243.6	239.9
30	235.7	240.2	237.4	236.0	......	241.3	239.4
31	235.5	......	237.0	235.9	......	240.5	......

Mean Daily Elevation of Water Surface of Mohawk River at Amsterdam, Montgomery County, N. Y., Gauge No. 10.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	248.2	251.3	250.3	250.4	249.8	251.7
2	......	248.8	250.8	250.2	250.3	249.8	251.2
3	......	248.8	250.5	251.4	250.3	249.8	251.9
4	......	248.4	250.4	251.6	250.2	250.0	253.4
5	......	248.5	253.0	251.2	250.1	250.1	254.5
6	......	248.5	252.2	251.4	250.2	250.3	254.7
7	......	248.5	251.8	251.3	250.1	250.2	256.2
8	......	248.6	251.6	251.2	250.3	250.1	257.1
9	......	250.5	251.3	251.3	250.2	250.3	255.3
10	......	250.4	250.6	251.6	250.3	250.4	254.3
11	......	249.9	250.3	25[illegible].2	250.2	251.4	253.3
12	......	249.4	250.1	251.9	250.2	252.4	253.0
13	......	249.2	250.0	251.9	250.1	252.3	252.7
14	......	249.2	249.9	251.6	250.2	252.1	252.8
15	......	249.1	249.9	251.3	250.1	251.9	252.9
16	......	249.1	249.9	251.2	250.1	252.4	252.8
17	......	218.9	250.3	251.1	250.0	252.4	252.6
18	......	248.9	251.9	251.3	250.0	252.4	252.5
19	......	249.0	252.0	251.1	250.0	253.4	252.5
20	......	249.7	252.0	250.9	250.1	254.2	252.4
21	......	251.2	251.9	250.5	250.1	254.8	254.9
22	......	251.2	251.8	250.7	250.0	260.7	260.6
23	......	250.9	251.6	251.4	250.0	257.0	258.4
24	248.3	250.4	251.4	251.4	250.0	254.7	256.1
25	249.1	250.1	253.4	251.0	249.9	254.0	257.6
26	249.6	253.3	252.8	251.5	249.8	256.1	255.6
27	249.2	256.3	252.4	251.0	249.9	258.3	253.6
28	248.9	255.2	251.7	250.5	249.9	257.8	......
29	248.9	253.2	251.3	250.6	......	254.8	......
30	248.5	252.1	250.9	250.5	......	252.7	......
31	248.8	.....	250.4	250.4	......	252.3	......

Mean Daily Elevation of Water Surface of Mohawk River at Fort Hunter, Montgomery County, N. Y., Gauge No. 13.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	267.9	269.9	269.2	269.4	269.4	270.4
2	......	267.8	269.6	269.2	269.4	269.4	270.0
3	......	267.7	269.3	269.2	269.4	269.4	270.5
4	......	267.7	269.9	269.2	269.4	269.4	271.8
5	......	267.7	271.5	269.2	269.4	269.4	272.6
6	......	267.6	270.5	269.4	269.4	269.4	272.7
7	......	267.6	270.4	269.4	269.4	269.4	273.6
8	......	267.7	270.3	269.4	269.4	269.4	274.1
9	......	269.5	270.2	269.4	.....	269.4	273.2
10	......	269.3	269.3	269.4	269.4	269.4	272.5
11	......	268.7	269.3	269.4	269.4	269.7	272.4
12	......	268.3	269.1	269.4	269.4	271.4	272.0
13	......	268.2	269.3	269.4	269.4	271.3	271.7
14	......	268.1	269.2	269.4	269.4	271.1	271.6
15	......	268.1	269.2	269.4	269.4	270.9	271.6
16	......	268.0	269.2	269.5	269.4	271.2	271.5
17	......	267.8	269.1	269.4	269.4	271.4	271.4
18	......	267.8	269.1	269.4	269.4	270.7	271.4
19	......	267.8	269.1	269.4	269.4	271.4	271.4
20	......	267.9	269.1	269.4	269.4	271.6	271.4
21	......	268.0	269.1	269.4	269.4	272.6	272.2
22	......	270.0	269.1	269.4	259.4	273.1	276.2
23	......	269.9	269.1	269.4	269.4	271.6	275.0
24	......	269.5	269.1	269.4	269.4	271.8	273.8
25	268.2	272.0	270.4	269.4	269.4	271.7	275.0
26	268.5	273.7	270.2	269.4	269.4	273.2	273.2
27	268.1	273.1	270.2	269.4	269.4	274.8	272.3
28	267.9	272.2	269.5	269.4	269.4	274.3	......
29	267.9	270.6	269.3	269.4	......	272.6	......
30	267.9	270.1	269.2	269.4	......	272.2	......
31	267.9	......	269.2	269.4	......	270.9	......

Mean Daily Elevation of Water Surface of Mohawk River at Yosts, Montgomery County, N. Y., Gauge No. 14.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	276.4	279.9	278.2	277.5	277.4	280.5
2	......	276.4	279.0	277.8	277.4	277.4	279.5
3	......	276.3	278.5	277.5	277.4	277.5	281.0
4	......	276.1	278.3	277.2	277.4	277.5	283.0
5	......	275.9	282.0	277.2	277.4	277.6	283.7
6	......	275.9	280.8	277.3	277.4	277.9	283.1
7	......	276.0	280.5	277.4	277.6	277.7	284.2
8	......	276.4	280.3	277.5	277.8	277.4	285.0
9	......	279.4	280.1	277.7	277.8	277.6	284.7
10	......	278.7	278.6	278.9	277.7	278.4	283.6
11	......	277.7	277.8	279.1	277.6	279.0	282.7
12	......	277.0	278.9	279.1	277.5	280.0	282.0
13	......	276.8	278.8	279.0	277.7	280.0	281.7
14	......	276.6	279.1	278.7	277.7	279.7	281.9
15	......	276.5	278.4	278.6	277.7	279.5	282.3
16	......	276.3	278.1	278.5	277.6	280.1	282.3
17	......	276.2	278.1	278.5	277.5	280.2	281.8
18	......	276.1	278.1	278.9	277.5	279.8	282.0
19	......	276.4	278.0	278.6	277.5	281.7	282.0
20	......	278.0	278.4	278.1	277.6	281.4	281.7
21	......	280.2	278.4	277.8	277.6	283.0	281.7
22	......	280.0	278.3	278.1	277.5	285.8	286.0
23	......	279.5	278.1	278.6	277.6	285.1	......
24	......	278.7	278.2	278.6	277.5	285.4	285.5
25	......	278.1	280.9	278.3	277.4	285.4	285.0
26	......	284.3	281.1	278.1	277.4	287.2	282.8
27	......	286.6	280.4	277.9	277.5	289.2	281.5
28	......	286.4	279.4	277.7	277.5	288.2	......
29	276.7	282.9	278.8	277.6	......	284.9	......
30	276.5	281.3	278.3	277.5	......	282.7	......
31	276.3	......	278.1	277.5	......	281.4	......

Mean Daily Elevation of Water Surface of Mohawk River at Canajoharie, Montgomery County, N. Y., Gauge No. 15.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	286.2	288.1	287.8	286.2	285.9	289.4
2	......	285.8	288.6	287.0	286.1	286.0	289.7
3	......	285.7	287.0	286.2	286.1	286.0	290.2
4	......	285.7	287.3	286.4	286.1	286.0	291.5
5	......	285.4	289.3	286.1	286.0	286.2	292.1
6	......	285.4	289.2	286.1	286.0	286.3	291.5
7	......	284.8	289.5	286.1	286.0	286.2	292.5
8	......	284.8	289.0	286.5	285.9	286.1	293.1
9	......	289.4	288.7	287.1	285.9	286.2	293.1
10	......	287.8	288.1	288.1	285.9	287.0	292.1
11	......	287.7	288.5	288.5	285.9	287.7	291.1
12	......	286.3	288.8	287.8	285.9	288.4	290.4
13	......	286.2	291.0	288.1	285.9	288.4	290.4
14	......	286.3	290.4	287.4	285.9	288.4	290.8
15	......	286.2	288.7	287.4	285.9	288.2	291.3
16	......	285.6	289.3	287.0	285.9	288.5	291.1
17	......	285.5	289.2	286.4	286.0	290.5	290.5
18	......	285.7	287.7	286.2	286.1	288.4	291.0
19	......	286.1	287.2	286.2	286.2	289.2	290.9
20	......	286.9	288.2	286.4	286.2	289.0	290.4
21	......	288.2	288.0	286.5	286.2	291.7	290.4
22	......	287.8	287.7	287.2	286.2	293.5	293.5
23	......	288.4	287.9	287.1	286.2	293.0	294.9
24	......	287.9	288.0	286.8	286.1	292.8	293.6
25	286.9	287.4	290.4	286.9	285.9	292.9	292.9
26	286.2	293.3	291.1	286.5	286.0	292.9	291.5
27	285.9	294.7	290.0	286.5	286.1	296.1	290.5
28	285.9	294.5	289.1	286.5	285.9	296.0	289.7
29	285.9	291.6	288.2	286.2	......	293.0	288.7
30	285.8	289.7	287.9	286.2	......	291.4	287.9
31	286.3	......	287.8	286.2	......	290.3	......

Mean Daily Elevation of Water Surface of Mohawk River at St. Johnsville, Montgomery County, N. Y., Gauge No. 16.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb	Mar.	Apr.
1	......	298.9	301.8	300.2	299.9	......	302.1
2	......	298.9	301.1	299.9	300.0	......	301.6
3	......	298.7	300.6	299.6	299.9	299.6	302.6
4	......	298.5	300.7	299.5	299.9	299.6	304.0
5	......	298.4	303.2	299.6	300.0	299.6	304.3
6	......	298.4	302.4	299.8	300.2	299.6	304.6
7	......	298.5	302.4	299.6	300.3	299.6	305.0
8	......	299.9	302.2	299.8	300.3	299.6	305.6
9	......	302.4	301.5	300.8	300.1	299.7	305.0
10	......	301.6	300.6	301.1	300.0	300.0	304.6
11	......	300.1	300.0	301.2	300.0	300.4	303.5
12	......	299.4	300.0	301.0	299.9	300.9	303.2
13	......	299.2	300.2	300.8	299.9	301.1	303.2
14	......	299.2	299.7	300.6	299.9	301.0	......
15	......	299.2	301.6	300.4	299.9	300.9	......
16	......	298.8	301.3	300.4	299.9	301.2	......
17	......	298.7	301.0	300.5	299.8	301.2	......
18	......	298.6	300.6	300.8	299.9	300.9	......
19	......	299.8	300.8	300.5	299.9	302.3	......
20	......	301.9	301.0	300.3	300.0	302.0	......
21	......	303.4	301.0	300.2	299.9	304.0	......
22	......	302.9	300.4	300.8	299.9	305.6	......
23	......	302.2	300.2	300.8	299.7	307.0	......
24	......	301.0	301.1	300.6	......	308.2	......
25	......	301.1	303.0	300.4	......	308.0	......
26	......	307.6	303.0	300.3	......	307.9	......
27	......	308.2	302.2	300.2	......	310.1	......
28	299.1	307.6	301.1	300.1	......	309.1	......
29	299.1	303.8	300.6	300.1	......	305.8	......
30	298.9	302.6	300.5	300.1	......	304.0	......
31	298.7	......	300.2	300.0	......	302.9	......

Mean Daily Elevation of Water Surface of Mohawk River at Rocky Rift Dam, Herkimer County, N. Y., Gauge No. 17.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	316.6	319.3	......	316.7	316.6	319.1
2	......	316.7	318.6	......	316.6	316.6	319.0
3	......	316.5	318.2	......	316.6	316.6	319.5
4	......	316.4	318.1	......	316.6	316.6	321.1
5	......	316.3	319.9	......	316.7	316.6	321.3
6	......	316.3	320.0	......	316.8	316.7	321.4
7	......	316.4	320.7	......	316.9	316.8	321.7
8	......	318.2	320.1	317.3	316.9	317.1	322.4
9	......	319.7	319.3	317.4	317.0	317.1	322.8
10	......	318.6	318.5	318.1	316.9	317.3	322.2
11	......	317.7	317.9	318.3	316.8	317.6	320.9
12	......	317.1	317.8	318.1	316.8	317.9	320.4
13	......	317.1	317.6	318.0	316.9	317.8	320.3
14	......	316.9	317.5	317.7	317.2	317.7	320.3
15	......	316.9	317.3	317.5	317.1	317.9	320.3
16	......	316.8	317.2	317.4	316.8	317.9	320.2
17	......	316.6	317.2	317.5	316.7	318.0	320.3
18	......	316.6	317.1	316.9	316.7	318.1	320.3
19	......	317.0	317.3	317.3	316.7	319.2	320.4
20	......	318.9	317.6	317.3	316.7	319.8	320.1
21	......	320.2	317.6	316.8	316.6	321.4	320.2
22	......	319.2	317.5	317.0	316.5	321.7	322.1
23	......	319.2	317.5	317.5	316.5	322.1	324.3
24	......	318.5	318.5	317.2	316.5	321.6	323.7
25	......	319.4	319.6	316.8	316.5	321.5	322.2
26	......	324.0	319.7	317.3	316.5	322.7	320.8
27	......	325.3	319.2	317.0	316.5	324.2	320.1
28	316.7	324.7	318.6	316.8	316.5	323.7	319.6
29	316.9	322.1	317.8	316.7	......	322.4	319.4
30	316.7	320.0	317.5	316.7	......	321.2	319.3
31	316.8	......	317.5	316.7	......	320.1	......

Mean Daily Elevation of Water Surface of Mohawk River Above [illegible] Dam, [illegible] County, N. Y., Gauge No. [illegible]

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
2		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
3		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
4		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
5		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
6		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
7		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
8		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	[illegible]	[illegible]	[illegible]	[illegible]	....	[illegible]	[illegible]
30	[illegible]	[illegible]	[illegible]	[illegible]	....	[illegible]	[illegible]
31	[illegible]	..	[illegible]	[illegible]	....	[illegible]	......

Mean Daily Elevation of Water Surface of Mohawk River Above Little Falls State Dam, Herkimer County, N. Y., Gauge No. 23.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	363.8	364.9	364.2	363.8	363.8	365.0
2	......	363.8	364.6	364.2	363.7	363.9	364.8
3	......	363.7	364.4	364.1	363.8	364.0	365.5
4	......	363.7	364.5	364.0	363.8	364.0	365.8
5	......	363.8	365.5	363.9	363.8	363.9	365.8
6	......	363.6	365.2	363.9	363.7	363.8	365.7
7	......	363.7	365.4	363.9	363.8	363.8	366.0
8	......	364.6	365.2	363.9	363.8	363.8	366.3
9	......	365.3	364.8	364.3	363.9	363.9	366.4
10	......	364.7	364.2	364.4	363.9	364.2	366.1
11	......	364.3	363.9	364.4	363.9	364.2	365.7
12	......	364.0	364.2	364.4	363.9	364.3	365.5
13	......	363.9	364.1	364.3	363.8	364.4	365.5
14	......	363.9	364.0	364.1	363.8	364.4	365.6
15	......	363.9	364.0	364.2	363.8	364.4	365.4
16	......	363.8	364.1	364.2	364.0	364.4	365.6
17	......	363.7	364.0	364.2	363.9	364.4	365.6
18	......	362.8	364.0	364.3	363.9	364.3	365.7
19	......	364.0	364.0	364.1	363.9	364.7	365.6
20	......	365.0	364.1	364.0	363.9	364.7	365.4
21	......	365.6	364.2	363.9	363.9	365.3	365.3
22	......	365.5	364.2	364.1	363.8	365.8	366.6
23	......	365.0	364.3	364.1	363.8	366.1	366.6
24	......	364.6	364.7	364.1	363.9	366.0	366.4
25	......	364.9	365.0	364.1	363.9	366.1	366.2
26	......	367.5	365.2	364.0	363.9	367.4	365.9
27	......	368.1	365.1	363.8	363.8	369.1	365.5
28	363.9	367.5	364.5	363.9	363.8	368.6	......
29	364.0	366.0	364.4	363.8	......	367.2	......
30	363.8	365.4	364.2	363.9	......	366.1	......
31	363.8	......	364.3	363.8	.....	365.5	......

Mean Daily Elevation of Water Surface of Mohawk River at Herkimer, Herkimer County, N. Y., Gauge No 24.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	375.5	380.1	......	377.6	382.6	378.1
2	......	375.2	377.1	......	378.3	381.6	378.6
3	......	374.7	377.4	......	378.2	381.1	380.1
4	......	......	378.0	......	377.6	380.6	380.1
5	......	......	378.6	......	377.4	379.6	380.6
6	......	375.6	379.2	......	377.1	379.6	380.8
7	......	376.2	379.2	......	377.6	378.6	381.2
8	......	377.4	377.9	377.6	378.3	378.6	381.5
9	......	378.3	377.3	377.6	378.6	383.6	381.1
10	......	377.3	377.0	377.6	378.3	377.3	380.6
11	......	376.5	377.0	378.1	378.3	378.4	380.6
12	......	375.9	377.1	378.6	378.1	378.5	380.1
13	......	375.4	377.6	377.9	377.9	378.5	379.6
14	......	375.3	377.6	377.8	377.2	377.6	379.1
15	......	375.1	377.8	377.6	376.9	377.1	378.6
16	......	375.5	377.6	377.8	376.6	377.6	378.6
17	......	375.5	377.8	378.4	377.0	378.1	378.6
18	......	374.5	377.8	378.2	377.0	378.6	378.4
19	......	376.0	378.9	378.4	377.1	379.6	378.4
20	......	376.7	379.3	378.4	377.4	381.4	378.4
21	......	377.3	379.2	378.8	377.3	382.6	......
22	......	378.5	379.1	378.8	377.2	380.9	......
23	......	378.5	378.8	377.6	376.8	380.2	......
24	......	378.6	378.6	376.8	376.8	380.5	......
25	......	379.3	379.4	376.6	376.6	381.4	......
26	......	382.6	379.1	377.2	376.6	383.1	......
27	......	383.9	378.9	377.2	383.6	384.7	......
28	375.3	383.2	378.6	377.4	382.6	384.2	......
29	375.2	382.0	378.0	377.9	......	382.9	......
30	374.8	380.6	......	378.4	......	382.3	......
31	374.8	......	......	378.1	......	378.4	......

Location of Mohawk River Slope Gauges.

Gauge number.	LOCATION.	Elevation of gauge zero.	Difference of elevation of gauge zeros.
1	Above Cohoes Company's Dam	150.95	......
2	Below West Troy Company's dam, Dunsbach Ferry	164.30	13.35
3	Above West Troy Company's dam, Dunsbach Ferry	172.23	7.93
4	Vischer's Ferry Bridge	174.09	1.86
5	Below Rexford Flats dam	204.38	30.29
6	Above Rexford Flats dam	208.35	3.97
8	Freeman's bridge, Schenectady	203.76	—4.59
9	Hoffman's Ferry	232.56	28.80
10	Amsterdam	248.45	15.89
13	Fort Hunter	267.56	19.11
14	Yosts	274.69	7.13
15	Canajoharie	284.68	9.99
16	St. Johnsville	297.37	12.69
17	Below Rocky Rift Dam	315.40	18.03
18	Above Rocky Rift Dam	319.78	4.38
19	Below Little Falls Paper Compay's mill	321.00	1.22
22	Above Gilbert's dam, Little Falls, N. Y	333.81	12.81
23	Above New York State dam, Little Falls, N. Y	362.29	28.48

During the severe winter months the river was frozen over throughout the greater portion of its length, the greatest depth of ice at the gauging stations varied from two to three feet. When the river surface was frozen, holes were chopped through the ice around the gauges. At such times the readings show the elevation of the water surface as it rose in these openings.

Readings were not taken at simultaneous hours at the different stations. In reducing the records, the means of the two daily readings at each station have been used to determine the fall and surface slope from station to station. The accompanying tables show the resulting mean elevation of water surface at the principal stations.

Gauge No. 1.— Above Cohoes Company's dam; record from October 28, 1900, to April 27, 1901, inclusive. Readings in feet and tenths were taken between 6 and 7 a. m., and again between 6 and 7 p. m. William Butler, observer. Gauge was attached vertically to cribwork back of masonry ice breaker, 150 feet upstream from right-hand end of the Cohoes Company's dam.

Gauge No. 2.— Below West Troy Company's dam; readings in feet and decimals, taken at 7 a. m. and between 4.30 and 5.30 p. m., Frederick H. Burgess, gauge reader. March 23, 1901, an ice gorge two miles below this dam backed water to at least 17 feet on gauge No. 2 and carried away part of gauge; ice was left in piles from 10 to 12 feet high along the banks.

Gauge No. 3.— Above West Troy Company's dam; readings taken from 5 to 5.30 p. m., by Frederick Burgess. Readings to 5 feet were taken from vertical gauge attached to bulkhead above dam; readings of 5 feet or over were taken from gauge attached to face of forebay timber adjoining pump house. Gauge was divided decimally and is situated about 50 feet upstream from lower section of dam, right-hand end.

Gauge No. 4.— Vischer's Ferry bridge, L. S. Clute, observer, readings in feet and decimals, taken at 6 a. m. and from 5 to 6 p. m. December 7, 1900, river became blocked by ice, submerging the gauge. March 22, 1901, 3.30 a. m., an ice gorge broke away; maximum gauge reading 14.0 feet.

Gauge No. 5.— Below Rexford Flats dam, H. R. Betts, observer. Record from October 21, 1900, to May 4, 1901, inclusive;

readings in feet and tenths. Gauge was attached to lower end face of the right-hand abutment of dam. Gauge carried away by high water March 27, 1901, and measurements from that date were made in feet and inches from corner of bulkhead down to water surface.

Gauge No. 6.— Fifty feet above Rexford Flats dam, H. R. Betts, observer; gauge divided decimally.

Gauge No. 9.— Mohawk River at Hoffman's Ferry, L. D. Phillips, observer; readings taken at 9 a. m. and 5 p. m. in feet and decimals, from October 24, 1900, to April 30, 1901. Gauge board in three sections, attached vertically to trees on left bank 50 feet upstream from ferry cable.

Gauge No. 10.— Amsterdam, on Mohawk River, E. Simkins, observer; readings taken in feet and decimals at 7.30 a. m. and 4.30 p. m. from October 24, 1900, to April 27, 1901, inclusive. Owing to breaking up of ice, the water rose on March 22, 1901, and broke gauge at 7.6 foot elevation; all readings after that date above 7.6 were estimated from the noted position of points on the bridge pier. Gauge was attached vertically to east end of north pier of highway bridge.

Gauge No. 13.— Mohawk River at Fort Hunter. A vertical gauge board divided decimally was attached to downstream face of north abutment of suspension bridge. John Brown, observer. Readings usually taken at 8 a. m. and 5 p. m. from October 25, 1900, to April 27, 1901, inclusive.

Gauge No. 14.— Mohawk River at Yosts, Fred Birch, gauge reader. Gauge board attached vertically to tree on left-hand bank of stream 500 feet below railroad station. Readings taken in feet and decimals, at 8 a. m. and 4 p. m. each day from October 29, 1900, to April 27, 1901, inclusive. April 23, 1901, gauge submerged by high water; reading about 13.6 feet.

Gauge No. 15.— Canajoharie or Palatine Bridge, William Hout, observer. Readings in feet and decimals taken at 7 a. m. and 5 p. m., from October 25, 1900, to April 30, 1901. Gauge board attached vertically to second pier from right bank, Palatine Bridge. December 13, 1900, river was blocked with ice.

River surface became frozen December 15, 1900. March 26, 1901, ice broke up and water rose above top of gauge.

Gauge No. 16.— On Mohawk River at St. Johnsville, W. B. Bucklin, observer. Readings taken in feet and decimals at 7.30 a. m. and 4.30 p. m., October 28, 1900, to April 13, 1901, inclusive, except February 24, to March 2, 1901. Gauge board was attached vertically to face of old bridge abutment on left-hand side of stream, 50 feet above present highway bridge.

Gauge No. 17.— Below Rocky Rift dam, five miles below Little Falls, J. H. Nickerson, observer. A vertical gauge board divided decimally was attached to a basswood tree 100 feet above the mouth of Crum Creek and about 280 feet below Rocky Rift dam. Readings taken from 7.30 to 9.20 a. m. and usually at 4 to 5 p. m. from October 28, 1900, to April 30, 1901, inclusive.

Gauge No. 18.— Gauge board was attached vertically to left-hand abutment of dam, 18 feet upstream from crest, divided decimally. Readings were taken at the same time as those of gauge No. 17.

Gauge No. 19, in tailrace of Little Falls Paper Company's mill, 800 feet downstream from Gilbert's dam. Gauge divided in feet and inches. Reading taken once each day by William Hoffman.

Gauge No. 23.— Above New York State dam at Little Falls. Charles B. Edic, observer. Readings in feet and decimals, usually at 8 a. m. and 5 p. m.

Gauge No. 24.— Mohawk River at Herkimer. Gauge attached to face of north abutment of Washington Street highway bridge.

In order to compute the results, the river has been divided into thirteen slope sections, each covering the portion of the river between two successive gauges. The line of gauges extended from the Washington Street bridge at Herkimer to the dam of the Cohoes Water Power Company. Throughout their entire length the slope sections are paralleled by Erie Canal. The records were not maintained during the season of canal navigation. However, the canal intercepts some run-off, which is usually carried in the canal to the nearest aqueduct or waste weir and there turned into the river. There are ten waste weirs in this portion of the canal.

At the entrance of every important tributary, a gravel bar has been formed extending into or across the channel of the Mohawk and forming a sort of submerged dam over which a rift appears in low water. Many low-lying islands obstruct the stream channel. These for the most part are submerged during high water.

Elements of Mohawk River Slope Sections.

Number.	From	To	Length, feet.	DRAINAGE AREA—SQUARE MILES.			
				Head.	Foot.	Difference.	Mean.
1	Herkimer..........	Little Falls State dam	39,789	701	1,296	595	998½
2	Gilbert's dam........	Rocky Rift dam......	21,864	1,306	1,337	31	1.321½
3	Rocky Rift dam.....	St. Johnsville........	30,996	1,337	1,687	350	1,362
4	St. Johnsville.......	Canajoharie..........	46,964	1,687	1,862	175	1,774½
5	Canajoharie.........	Yosts...............	35,223	1,862	2,003	141	1,932½
6	Yosts..............	Fort Hunter.........	54,140	2,003	3,094	1,091	2,548½
7	Fort Hunter........	Amsterdam..........	28,048	3,094	3,196	102	3,145
8	Amsterdam.........	Hoffmans Ferry.....	35,875	3,196	3,248	52	3,222
9	Hoffmans Ferry.....	Schenectady.........	60,658	3,248	3,311	63	3,279½
10	Schenectady........	Rexford Flats.......	14,350	3,311	3,385	74	3,348
11	Rexford Flats.......	Vischers Ferry.......	27,410	3,385	3,408	23	3,396½
12	Vischers Ferry......	West Troy Co.'s dam..	22,830	3,408	3,440	32	3,424
13	West Troy Co.'s dam	Cohoes Co.'s dam	28,048	3,440	3,465	25	3,452½

Mean Elevation of Stream Bed, Mohawk River Slope Sections.

Number.	From	To	Number of cross-sections.	Average elevation of stream bed.	Average width of stream bed.
1	Herkimer...............	Little Falls State dam.....	97	362.14	303
2	J. J. Gilbert's dam........	Rocky Rift dam..........	......	....	....
3	Rocky Rift dam	St. Johnsville.............	85	304.44	318
4	St. Johnsville	Canajoharie.............	60	288.28	380
5	Canajoharie.............	Yosts....................	56	273.76	295
6	Yosts...................	Fort Hunter.............	85	268.62	448
7	Fort Hunter.............	Amsterdam..............	37	256.99	675
8	Amsterdam.............	Hoffmans Ferry..........	50	235.50	595
9	Hoffmans Ferry..........	Schenectady.............	83	211.82	470
10	Schenectady............	Rexford Flats............	22	200.80	655
11	Rexford Flats............	Vischers Ferry...........	43	185.10	535
12	Vischers Ferry...........	Dunsbach Ferry..........	37	166.73	458
13	Dunsbach Ferry..........	Cohoes Compay's dam.....	44	152.33	302

Slope Section No. 1 extends from Herkimer to Little Falls State dam, a distance of 7.5 miles. The stream is tortuous, and contains a number of large islands. The channel is in earth throughout and the stream bed is of earth, gravel and cobble. It is bordered by extensive flood plains, affording surface storage during freshets. Backwater from Little Falls State dam affects the current throughout much of the length of the section.

One-half mile below the Herkimer gauge West Canada Creek enters the Mohawk, contributing the run-off from a drainage area of 569 square miles. The only other tributary of consequence is Beaver Brook, entering from the north in the middle of the section.

Slope Section No. 2 extends from the foot of the rapids below the lower or Gilbert dam in Little Falls to Rocky Rift or Five Mile feeder dam of New York State canals. The section is 4.1 miles in length. With the exception of the first mile, which is rocky, the stream channel is fairly straight and uniform. There is very little fall in this section, owing to backwater from Rocky Rift dam. The stream banks are overflowed in high water. The entering tributaries are small and quite uniformly distributed through the length of the slope section. The largest is Noudaga Creek. Its watershed lies south of the river near the head of the slope section.

Slope Section No. 3 extends from the foot of the rapids below Rocky Rift dam to a point about fifty feet above St. Johnsville highway bridge. East Canada Creek enters the section from the north, halfway between the two terminal gauging stations. The drainage area of East Canada Creek is 283 square miles. Other tributaries entering from the north are Crum Creek, Klock Creek and Zimmerman Creek. Tributaries from the south or canal side are unimportant.

The stream channel is fairly straight, containing occasional islands. The length of the section is 5.8 miles.

Slope Section No. 4 lies between the St. Johnsville and Canajoharie highway bridges; its length is 8.9 miles. Canajoharie Creek, draining an area of 69 square miles, enters on the south 500 feet below the head of the section. Otsquaga Creek, having a drainage area of 54 square miles, enters from the south at Fort Plain near the middle of the section. On the north side of the stream the only important tributary is Garoga Creek. This stream has a drainage area of 89 square miles. It flows into Mohawk River three miles below St. Johnsville. The river flows in a fairly uniform channel with occasional islands, and is bordered by a narrow flood plain.

A high water mark near Palatine Bridge at the head of the section shows the water to have risen to elevation 304.2, as the result of an ice gorge in the spring of 1893.

Slope Section No. 5, from Canajoharie bridge to a point 500 feet downstream from Yosts Station, includes a portion of the river channel 6.7 miles in length. The most important tributary is Flat Creek, draining an area of 42 square miles, which enters the Mohawk from the south at Sprakers, near the middle of the slope section. The upper portion of the section contains a number of islands.

Below Sprakers the channel is of nearly uniform width, the bends are of large radius and the regimen as a slope section good.

Slope Section No. 6, extending from the gauge near Yosts to Fort Hunter suspension bridge, comprises a stretch of the Mohawk without islands or abrupt bends, and of nearly uniform width. It receives a number of tributaries.

NAME OF TRIBUTARY.	Distance from head of slope section, miles.	Drainage area, square miles.	Enters which side of river.
Yatesville Creek	0.0	....	South.
Briggs River	1.0	....	North.
Allston Creek	2.0	....	South.
Cayadutta Creek	5.0	62	North.
Danoscara Creek	8.5	....	North.
Aurie Creek	8.5	42	South.
Schoharie Creek	9.7	947	South.

The total length of the section is 10.2 square miles. Schoharie Creek enters one-half mile above the lower end of the slope section. Its drainage, therefore, more properly belongs to the next lower slope section. Its relatively large run-off during freshets produces backwater, reducing the effective slope of the section above. The drainage area at the foot of the section, not including Schoharie Creek, is 2,147 square miles, and the mean for the section is 2,075 square miles.

Yatesville Creek enters the Mohawk just above the upstream end of the section under consideration; its drainage area has been included in the present section to which it most properly belongs rather than in that of the section next above.

Slope Section No. 7 includes Mohawk River from Fort Hunter to Amsterdam, a distance of 5.3 miles. The stream channel is broad and for the most part divided into two parallel courses by a line of narrow islands, extending through its center. The largest tributary is South Chuctenunda Creek, which enters 1,000 feet above the downstream end of the section. Kyaderoscras Creek enters at Akin nearly mid-length of the section.

Slope Section No. 8 extends from Amsterdam to a point 50 feet upstream from Hoffman's Ferry Cable. It includes a length of 6.8 miles through which the river flows in a broad and nearly straight channel interspersed with islands. Numerous small tributaries enter from both the north and south slopes, the most important being North Chuctenunda Creek at the head of the section.

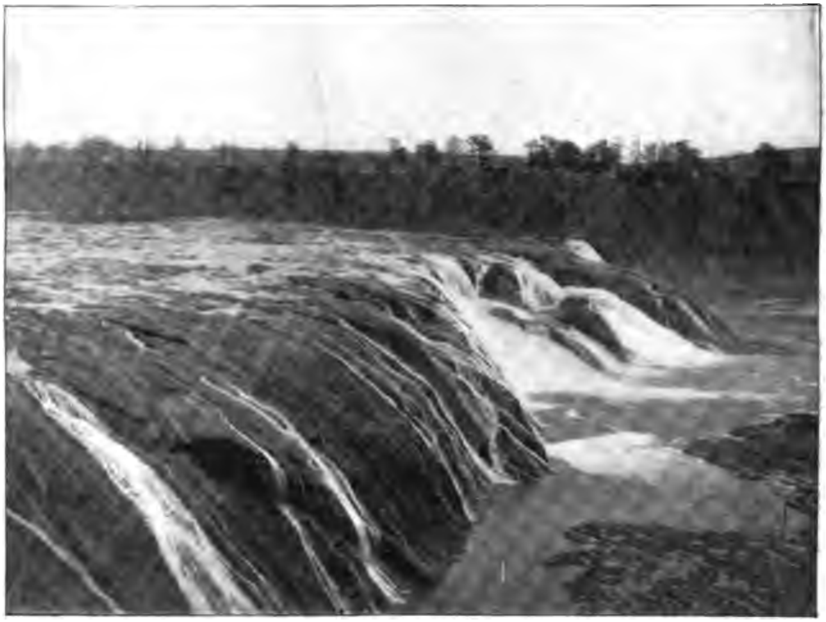
Slope Section No. 9 extends from Hoffman's Ferry to Freeman's Bridge one mile below Schenectady, a total distance of 11.3 miles. In the vicinity of Schenectady, the stream has several abandoned channels, of which Binne Kill is the largest. Through these the water flows only during freshets. During low water they become stagnant lagoons, enclosing large islands. Verf Kill, Poentic Kill, and Plotter Kill, and other small tributaries enter this section.

A high water mark at Glenville Bridge, Schenectady, shows an elevation of the water surface of 220.9 feet.

Slope Section No. 10 covers a length of 2.7 miles from Freeman's Bridge to the State feeder dam at Rexford Flats. The water level is controlled by the dam at the foot of the section, which forms a long, broad pond. Alplaus Kill is the only important tributary. This has a drainage area of 52 square miles, and enters from the north about one mile above the Rexford Flats dam.

At Delaware and Hudson railroad bridge, near the head of the section, the highest recorded water mark is elevation 222.9.

Slope Section No. 11, reaching from below Rexford Flats dam to Vischer's Ferry highway bridge, includes a length of the stream of 5.2 miles. The river channel is straight, of varying



Cohoes Falls (70 feet), Mohawk River, N. Y., 1902.

width and mostly free from islands. The fall is comparatively rapid. Below Rexford Flats the Erie canal crosses Mohawk river, following the left bank from Aqueduct to Crescent, where it recrosses to the right bank. The tributaries are small, Stony Kill, the largest, enters from the north near the foot of the section.

Slope Section No. 12, 4.3 miles in length, extends from Vischer's Ferry bridge to West Troy company's dam, near Dunsbach Ferry. Much of the section is included in flowage from the dam at its foot. In the upper reaches of this section the river broadens out and enfolds a number of islands. At Niskayuna the recorded flood elevation is 187.9. At Fort's Ferry the water is stated to have reached a height of 185.5 feet.

Slope Section No. 13, extending from below Dunsbach Ferry dam to Cohoes Company's dam, includes 5.3 miles of the stream. The surface level is affected by backwater from Cohoes Company's dam.

Lower Mohawk River, High-Water Marks. *a*

LOCATION.	Elevation.	Date.
Dunsbach Ferry bridge	187.6	Spring, 1868.
Dunsbach Ferry bridge	181.0	Ice gorge, spring, 1893.
Crescent Aqueduct	179.0	Ice, spring, 1868.
Crescent Aqueduct	174.3	Ordinary spring freshet.
Cohoes Company's dam	165.2	Ice freshet, spring, 1868.
Cohoes Company's dam	161.9	March 16, 1889.

a From U. S. Deep Waterways maps.

Fall of Mohawk River from Gauge No. 2, below West Troy Company's Dam, to Gauge No. 1, above Cohoes Company's Dam.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	11.10	11.75	11.20	11.15	11.35	9.90
2	......	11.05	11.25	11.30	11.10	10.90	11.05
3	......	10.85	11.45	11.15	10.65	10.75	11.90
4	......	10.70	11.40	11.05	11.20	11.10	8.30
5	......	11.05	12.18	11.05	11.32	10.95	9.45
6	......	10.95	12.10	10.85	11.35	10.90	9.80
7	......	11.00	11.85	11.05	11.34	10.95	9.20
8	......	11.15	11.90	10.95	11.82	10.80	7.10
9	......	11.30	11.55	10.80	11.46	10.75	8.65
10	......	11.65	11.20	11.05	10.55	10.70	9.75
11	......	10.95	11.60	11.30	11.60	10.85	9.45
12	......	10.95	11.45	11.20	12.08	11.30	8.65
13	......	11.05	11.60	11.15	12.03	11.50	8.60
14	......	11.00	11.30	11.10	11.99	11.25	8.65
15	......	11.10	11.10	11.25	11.95	11.25	8.70
16	......	11.07	10.95	11.20	11.93	11.25	8.75
17	......	10.90	11.15	11.20	10.60	11.25	8.75
18	......	10.70	11.15	11.40	11.53	11.35	8.85
19	......	11.00	11.20	11.50	11.97	11.70	8.85
20	......	10.90	11.25	11.25	11.98	11.85	8.90
21	......	11.40	11.15	11.05	12.09	9.95	8.15
22	......	11.60	10.95	10.85	11.97	......	......
23	11.80	11.45	11.05	11.00	11.47	......	......
24	11.30	11.40	10.85	11.20	10.65	......	7.30
25	11.85	11.20	11.00	11.09	11.15	......	6.95
26	11.12	11.55	11.90	11.05	11.30	......	7.05
27	10.95	13.25	11.65	10.90	11.40	......	10.55
28	10.85	12.90	11.60	11.10	11.35	......	......
29	11.10	12.30	11.35	11.10	......	9.10	......
30	10.95	11.85	11.10	10.80	......	8.70	......
31	11.00	......	11.05	10.90	......	9.25	......

*Fall of Mohawk River from Vischer's Ferry, Gauge No. 4, to West Troy Company's Dam, Gauge No. 3.**

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	—.04	1.96	2.31	1.71	1.41	.81
2	......	—.04	.66	2.56	1.71	1.31	.71
3	......	—.04	.46	3.01	1.31	1.16	.76
4	......	—.04	.26	2.76	1.41	1.26	1.66
5	......	—.19	1.11	2.66	1.36	1.16	2.01
6	......	—.14	1.21	2.36	1.46	1.11	2.06
7	......	—.19	.86	2.36	1.46	1.26	2.41
8	......	—.24	.66	2.41	1.46	1.31	3.46
9	......	.41	.56	2.56	1.46	1.21	2.46
10	......	.36	1.06	2.46	1.61	1.31	2.11
11	......	.36	2.16	2.66	1.31	1.91	1.66
12	......	.16	2.06	2.56	1.61	1.86	2.91
13	......	.06	2.51	2.46	1.46	1.86	1.31
14	......	.16	2 61	2.46	1.51	1.56	1.41
15	......	.16	2.51	2.51	1.46	1.71	1.36
16	......	.06	2.91	2.46	1.46	1.76	1.36
17	......	.01	2.61	2.56	1.46	1.56	1.26
18	......	.01	2.66	2.36	1.46	1.71	1.21
19	......	—.04	2.56	2.01	1.36	1.86	1.31
20	......	.11	2.56	2.21	1.21	2.16	1.26
21	......	.36	2.71	2.16	1.41	2.01	1.56
22	......	.46	2.66	2.16	1.46	2.96	5.51
23	—.04	.46	2.56	2.16	1.36	1.91	3.61
24	—.04	.46	2.56	2.11	1.26	1.81	3.01
25	—.04	.36	2.81	2.16	1.26	1.81	3.06
26	.11	.76	3.01	2.06	1.31	2.76	3.26
27	.21	2.31	2.86	2.21	1.41	2.71	1.76
28	.01	2.26	2.76	1.76	1.01	3.36	1.26
29	—.04	1.76	2.41	1.76	......	2.31	.91
30	—.09	1.16	2.61	1.71	......	1.41	.76
31	.01	......	2.26	1.71	......	1.06	......

* Minus sign indicates backwater from dam below.

Fall of Mohawk River from Rexford Flats, Gauge No. 5, to Vischer's Ferry, Gauge No. 4.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	29.44	28.34	27.39	28.14	28.74	30.02
2	......	29.59	28.79	27.09	28.24	28.79	30.69
3	......	29.49	29.14	26.79	28.44	28.89	30.52
4	......	29.49	29.09	27.04	28.39	28.79	27.35
5	......	29.64	27.99	27.29	28.39	28.84	26.82
6	......	29.69	27.74	27.39	28.39	28.69	26.84
7	......	29.79	28.29	27.29	28.44	28.59	30.10
8	......	29.89	28.39	27.11	28.59	28.59	26.99
9	......	30.04	28.59	26.86	28.59	28.69	30.28
10	......	29.39	......	27.19	28.44	28.69	31.88
11	......	29.49	......	26.94	28.64	28.19	33.46
12	......	29.64	......	26.89	28.39	27.99	32.89
13	......	29.74	......	27.04	28.54	27.99	34.63
14	......	29.69	......	26.99	28.59	28.04	27.50
15	......	29.69	......	27.09	28.69	27.99	27.33
16	......	29.79	......	27.09	28.59	27.94	27.24
17	......	29.89	......	27.24	28.64	28.04	27.24
18	......	29.89	......	27.44	28.59	27.94	27.30
19	......	30.04	......	27.34	28.69	27.74	27.07
20	......	29.94	......	27.29	28.79	27.49	27.22
21	......	29.44	......	27.74	28.54	27.44	27.07
22	......	29.04	......	27.94	28.50	26.09	28.14
23	29.99	29.14	......	27.79	28.69	27.14	29.07
24	29.99	29.14	26.99	27.59	28.69	26.94	29.73
25	29.94	29.39	26.39	27.59	28.59	27.04	30.05
26	29.94	28.94	25.39	27.74	28.54	27.69	28.10
27	29.69	27.74	25.94	28.39	28.54	......	28.70
28	29.79	27.29	26.14	28.74	28.99	27.36	29.16
29	29.64	27.34	26.69	28.64	......	27.40	29.54
30	29.59	27.99	26.74	28.24	......	28.13	29.70
31	29.44	......	27.19	28.19	......	29.00	......

*Fall of Mohawk River from Schenectady, Gauge No. 8, to Rexford Flats, Gauge No. 6.**

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	.09	.02	.66	.21	.41	.11	.86
2	.18	.15	.56	.31	.26	.06	.56
3	.17	.05	.36	.01	.26	.01	.56
4	.22	—.03	.26	.01	.21	.01	1.41
5	.17	.0	1.71	.41	.31	.06	.51
6	.17	—.03	1.11	.21	.21	.11	1.46
7	.01	—.10	.76	.16	.21	.26	1.51
8	.07	—.07	.76	.41	.01	.21	3.16
9	.15	.25	.66	.16	.01	.16	1.96
10	.07	.39	......	.16	.21	.11	1.71
11	.07	.41	......	.36	.11	.45	1.36
12	.11	.11	......	.41	.21	.56	1.01
13	.04	.06	......	.69	.16	.86	1.11
14	.14	.11	......	.43	.11	.61	1.11
15	—.05	.26	......	.26	.06	.46	1.16
16	—.02	.11	......	.08	—.04	.61	1.21
17	.0	.06	......	.01	.06	.61	1.11
18	.0	.06	......	.06	—.14	.51	1.03
19	.31	.11	......	.10	—.14	.61	1.21
20	.24	.61	......	.01	—.04	.81	1.01
21	.0	.21	......	.51	—.04	1.04	1.01
22	.0	.56	......	—.04	.06	2.76	4.08
23	—.07	.51	......	—.04	—.11	2.41	2.66
24	.0	.46	—.09	.16	.06	1.51	2.41
25	.08	.21	.26	.11	.06	1.41	2.44
26	.12	.94	1.41	.16	.16	2.13	2.66
27	—.03	2.01	1.06	—.54	.06	2.39	1.41
28	—.20	1.91	.69	.18	.11	3.06	1.11
29	—.21	1.66	.41	.56	......	2.26	.76
30	—.03	.91	.36	.11	......	1.51	.71
31	.04	......	.26	.46	......	.96	......

*Minus sign indicates backwater from dam below.

Fall of Mohawk River from Gauge No. 9, Hoffman's Ferry, to Gauge No. 8, Schenectady.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	26.00	27.80	27.05	26.10	26.15	27.85
2	......	26.10	27.55	26.70	26.20	26.05	27.55
3	......	26.07	27.50	26.60	26.25	26.15	28.45
4	......	25.80	27.45	26.35	26.20	26.20	28.30
5	......	25.75	29.10	25.90	26.10	26.30	28.90
6	......	25.63	28.05	26.60	26.50	26.85	28.75
7	......	25.70	28.15	26.55	26.60	26.80	29.55
8	......	25.87	28.10	26.35	26.80	26.55	28.10
9	......	27.90	26.90	26.60	26.75	26.40	28.70
10	......	27.30	27.30	26.65	26.75	26.90	28.35
11	......	26.80	27.00	27.35	26.95	27.60	28.34
12	......	26.55	27.25	27.25	26.45	28.05	28.50
13	......	26.45	26.85	26.77	26.75	27.65	28.30
14	......	26.35	26.70	27.08	27.30	27.50	28.50
15	......	26.35	27.80	26.90	27.00	27.55	28.55
16	......	26.25	28.80	26.83	27.20	28.00	28.45
17	......	25.95	28.60	26.75	26.46	28.15	28.30
18	......	26.05	28.30	26.55	26.25	27.70	28.33
19	......	26.05	28.30	26.56	26.35	28.75	28.35
20	......	26.90	28.40	26.80	26.25	28.75	28.30
21	......	28.35	28.40	26.10	26.25	28.92	29.55
22	......	27.75	28.10	26.45	26.20	29.00	23.33
23	......	27.65	27.85	27.35	26.25	27.05	29.40
24	25.40	27.25	27.60	26.90	26.25	28.30	28.65
25	26.22	27.05	30.25	26.75	26.35	28.30	29.52
26	26.75	29.32	28.15	26.45	26.00	29.13	27.60
27	26.30	29.25	28.00	26.30	26.35	29.42	28.40
28	26.05	28.85	27.57	25.53	26.30	28.45	27.85
29	26.15	28.00	27.30	25.75	......	28.30	28.00
30	26.15	27.95	27.25	26.55	......	28.05	27.90
31	26.05	......	27.00	26.25	......	28.10	......

Fall of Mohawk River from Gauge No. 10, Amsterdam, to Hoffman's Ferry, Gauge No. 9.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	12.84	11.94	13.14	14.54	14.24	11.84
2	......	13.34	12.09	13.39	14.64	14.44	12.14
3	......	13.34	12.19	15.04	14.59	14.39	11.94
4	......	13.29	12.39	15.64	14.59	14.49	11.34
5	......	13.49	11.39	15.44	14.64	14.39	11.19
6	......	13.64	11.54	15.19	14.39	13.99	11.44
7	......	13.64	11.74	15.19	14.14	13.89	11.39
8	......	13.59	11.74	15.14	14.19	14.09	11.24
9	......	12.39	12.94	15.09	14.04	14.44	11.29
10	......	12.29	12.29	15.19	14.09	13.94	11.39
11	......	12.74	12.74	14.74	13.89	13.74	11.39
12	......	12.89	12.89	14.44	14.24	13.54	11.49
13	......	13.14	12.64	14.64	13.94	13.34	11.59
14	......	13.24	12.59	14.39	13.49	13.79	11.49
15	......	13.24	12.09	14.39	13.64	13.69	11.49
16	......	13.34	11.29	14.49	13.54	13.44	11.44
17	......	13.54	11.04	14.44	14.14	13.29	11.59
18	......	13.59	13.84	14.64	14.29	13.84	11.59
19	......	13.59	13.99	14.49	14.29	13.54	11.49
20	......	13.19	13.79	14.29	14.49	13.69	11.59
21	......	12.09	13.54	14.19	14.39	13.74	12.49
22	......	12.09	13.74	14.54	14.34	15.54	16.84
23	......	12.14	13.84	14.39	14.44	15.29	11.64
24	13.89	12.34	13.89	14.49	14.29	12.64	11.19
25	13.79	12.59	12.69	14.39	14.24	11.94	10.19
26	12.80	11.69	12.89	15.24	14.44	10.94	10.99
27	13.09	11.64	12.99	14.94	14.29	11.54	11.39
28	13.34	11.29	13.29	14.44	14.24	12.14	......
29	13.29	11.44	13.54	14.64	......	11.19	......
30	12.79	11.84	13.49	14.49	......	11.39	......
31	13.34	......	13.34	14.49	......	11.79	......

Fall of Mohawk River from Fort Hunter, Gauge No. 13, to Amsterdam, Gauge No. 10.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	19.71	18.56	18.91	19.01	19.66	18.71
2	......	19.01	18.81	18.96	19.06	19.56	18.86
3	......	18.96	18.81	17.76	19.11	19.56	18.61
4	......	19.31	19.51	17.66	19.21	19.36	18.36
5	......	19.21	18.46	18.01	19.26	19.26	18.16
6	......	19.11	18.26	18.01	19.21	19.06	18.16
7	......	19.11	18.56	18.11	19.31	19.16	17.41
8	......	19.06	18.66	18.21	19.11	19.26	17.06
9	......	19.06	18.86	18.11	......	19.11	17.96
10	......	18.86	18.71	17.81	19.11	19.01	18.21
11	......	18.81	19.06	17.21	19.21	18.26	19.06
12	......	18.96	19.01	17.51	19.21	19.01	19.01
13	......	18.96	19.36	17.51	19.26	19.06	18.97
14	......	18.91	19.26	17.81	19.21	19.01	18.81
15	......	18.96	19.31	18.11	19.31	18 96	18.71
16	......	18.91	19.31	18.26	19.31	18.81	18.71
17	......	18.91	18.86	18.31	19.36	19.01	18.81
18	......	18.91	17.21	18.11	19.21	18.36	18.86
19	......	18.76	17.11	18.31	19.21	17.96	18.86
20	......	18.26	17.11	18.51	19.26	17.41	19.01
21	......	16.86	17.21	18.91	19.31	17.76	17.86
22	......	18.76	17.26	18.66	19.41	12.41	15.56
23	......	19.01	17.51	17.96	19.36	14.61	16.61
24	......	19.16	17.71	18.01	19.41	17.06	17.71
25	19.16	21.86	17.00	18.36	19.51	17.76	17.46
26	18.91	20.46	17.41	17.91	19.61	17.06	17.66
27	18.96	16.81	17.81	18.41	19.51	16.46	18.71
28	19.01	16.91	17.76	18.91	19.51	16.51	......
29	19.01	17.31	17.96	18.81	......	17.86	......
30	29.46	18.06	18.26	18.91	......	19.46	......
31	19.06	......	18.81	18.96	......	18.66	......

Fall of Mohawk River from Yosts, Gauge No. 14, to Fort Hunter, Gauge No. 13.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	8.53	10.08	9.03	8.13	7.98	10.13
2	......	8.63	9.48	8.68	8.03	8 03	9.53
3	......	8.63	9.28	8.38	8.03	8.13	10.53
4	......	8.43	8.48	7.98	8.03	8.13	11.28
5	......	8.28	10.53	7.98	8.03	8.28	11.13
6	......	8.33	10.33	7.98	8.03	8.53	10.38
7	......	8.43	10.13	8.03	8.23	8.33	10.08
8	......	8.78	10.03	8.13	8.43	8.08	10.93
9	......	9.93	9.93	8.33	......	8.28	11.53
10	......	9.48	9.28	9.53	8.33	9.08	11.18
11	......	9.03	8.48	9.73	8.28	9.33	10.33
12	......	8.73	9.88	9.73	8.13	8.58	10.03
13	......	8.63	9.53	9.63	8.33	8.68	10 02
14	......	8.58	9.98	9.38	8.33	8.63	10.38
15	......	8.43	9.23	9.23	8.33	8.63	10.78
16	......	8.38	8.98	9.03	8.28	8.93	10.83
17	......	8.38	8.98	9.18	8.18	8.83	10.48
18	......	8.33	9.03	9.53	8.18	9.13	10.63
19	......	8.68	8.98	9.23	8.13	10.38	10.68
20	......	10.08	9.33	8.73	8.28	9.83	10.38
21	......	12.23	9.38	8.43	8.20	10.48	9.48
22	......	10.08	9.28	8.73	8.13	12.73	9.83
23	......	9.63	9.03	9.28	8.23	13.58	......
24	......	9.23	9.13	9.28	8.13	13.63	11.68
25	......	6.18	10.53	8.98	8.08	13.73	10.03
26	......	10.63	10.88	8.78	8.03	14.03	9.53
27	......	13.53	10.28	8.53	8.13	14.43	9.23
28	......	14.23	9.98	8.38	8.13	13.88	......
29	8.83	12.38	9.58	8.28	......	12.33	......
30	8.63	11.23	9.13	8.13	......	10.53	......
31	8.58	......	8.93	8.13	......	10.48	......

Fall of Mohawk River from Canajoharie, Gauge No. 15, to Yosts, Gauge No. 14.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	9.79	8.14	9.59	8.69	8.54	8.89
2	......	9.34	9.59	9.19	8.69	8.59	10.14
3	......	9.39	8.44	8.69	8.69	8.49	9.14
4	......	9.64	8.94	9.19	8.64	8.54	8.49
5	......	9.44	7.34	8.89	8.59	8.59	8.39
6	......	9.49	8.34	8.74	8.59	8.44	8.39
7	......	8.78	8.99	8.69	8.39	8.54	8.31
8	......	8.35	8.69	8.99	8.09	8.69	8.09
9	......	9.99	8.59	8.39	8.04	8.59	8.34
10	......	9.04	9.54	9.19	8.19	8.59	8.44
11	......	9.94	10.74	9.39	8.24	8.69	8.39
12	......	9.24	9.84	8.69	8.39	8.39	8.44
13	......	9.44	12.14	9.09	8.19	8.44	8.69
14	......	9.64	11.24	8.69	8.19	8.69	8.84
15	......	9.69	10.29	8.79	8.19	8.74	8.94
16	......	9.24	11.19	8.49	8.24	10.44	8.79
17	......	9.34	11.14	7.89	8.49	10.29	8.69
18	......	9.56	9.59	7.27	8.59	8.59	8.99
19	......	9.69	9.14	7.57	8.69	7.74	8.84
20	......	8.89	9.79	8.29	8.59	7.64	8.69
21	......	7.97	9.54	8.74	8.59	8.69	8.74
22	......	7.74	9.34	9.09	8.69	7.64	7.49
23	......	8.94	9.79	8.44	8.59	7.89	......
24	......	9.19	9.79	8.14	8.64	7.44	8.09
25	......	9.24	9.49	8.54	8.44	7.44	7.89
26	......	8.99	9.99	8.34	8.64	5.69	8.69
27	......	8.04	9.59	8.59	8.59	6.94	8.99
28	......	8.09	9.64	8.74	8.44	7.79	......
29	9.19	8.64	9.34	8.59	......	8.09	......
30	9.24	8.39	9.59	8.69	......	8.69	......
31	9.99	......	9.74	8.69	......	8.89	......

Fall of Mohawk River from Gauge No. 16, St. Johnsville, to Gauge No. 15, Canajoharie.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	12.69	13.69	12.39	13.69	......	12.74
2	......	13.09	12.49	12.84	13.89	......	11.89
3	......	12.94	13.64	13.39	13.84	13.59	12.44
4	......	12.74	13.39	13.09	13.84	13.59	12.44
5	......	12.99	13.84	13.54	13.99	13.34	12.14
6	......	12.99	13.29	13.74	14.19	13.24	13.09
7	......	13.75	12.89	13.49	14.29	13.34	12.47
8	......	15.08	13.24	13.34	14.39	13.44	12.49
9	......	12.94	12.84	13.69	14.19	13.49	12.94
10	......	13.79	12.44	12.99	14.09	12.94	12.49
11	......	12.39	11.44	12.69	14.09	12.74	12.44
12	......	13.09	11.24	13.24	13.99	12.49	12.74
13	......	12.99	9.19	12.69	13.99	12.64	12.79
14	......	12.89	9.29	13.19	13.99	12.64	......
15	......	13.04	12.89	12.99	13.99	12.64	......
16	......	13.24	11.94	13.39	13.99	12.64	......
17	......	13.14	11.79	14.04	13.74	10.69	......
18	......	12.92	12.94	14.66	13.74	12.44	......
19	......	13.64	13.64	14.31	13.69	13.09	......
20	......	14.99	12.84	13.89	13.74	12.94	......
21	......	15.19	12.99	13.69	13.69	12.24	......
22	......	15.09	12.69	13.64	13.69	12.09	......
23	......	13.79	12.29	13.74	13.49	13.94	......
24	......	13.09	13.09	13.84	......	15.39	......
25	......	13.74	12.54	13.49	......	15.14	......
26	......	14.24	11.89	13.79	......	14.99	......
27	......	13.54	12.14	13.69	......	13.94	......
28	13.19	13.14	12.04	13.59	......	13.14	......
29	13.24	12.24	12.39	13.84	......	12.79	......
30	13.09	12.84	12.59	13.89	......	12.59	......
31	12.34	......	12.39	13.79	......	12.59	......

Fall of Mohawk River from Rocky Rift Dam, Gauge No. 17, to St. Johnsville, Gauge No. 16.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1.	......	17.73	17.49	......	16.78	......	16.93
2.	......	17.81	17.48	......	16.63	......	17.38
3.	......	17.78	17.53	......	16.68	17.03	16.83
4.	......	17.88	17.43	......	16.73	16.98	17.13
5.	......	17.91	16.73	......	16.73	16.98	16.98
6.	......	17.93	17.53	......	16.63	17.08	16.78
7.	......	17.86	18.33	......	16.63	17.18	16.73
8.	......	18.35	17.83	17.48	16.63	17.48	16.73
9.	......	17.33	17.73	16.63	16.88	17.33	17.78
10.	......	16.98	17.93	16.98	16.88	17 33	17.58
11.	......	17.66	17.93	17.08	16.83	17.18	17.33
12.	......	17.73	17.73	17.03	16.93	17.03	17.23
13.	......	17.83	17.48	17.18	17.03	16.73	17.13
14.	......	17.76	17.78	17.08	17.33	16.68	......
15.	......	17.63	15.71	17.08	17.18	17.03	......
16.	......	17.93	15.93	17.03	16.93	16.73	......
17.	......	17.93	16.16	16.98	16.93	16.78	......
18.	......	17.98	16.51	16.08	16.83	17.23	......
19.	......	17.23	16.43	16.78	16.83	16.88	......
20.	......	16.98	16.53	16.98	16.68	17.78	......
21.	......	16.76	16.58	16.58	16.68	17.38	......
22.	......	16.28	17.18	16.13	16.63	16.08	......
23.	......	16.96	17.28	16.63	16.78	15.08	......
24.	......	17.48	17.43	16.53	......	13.38	......
25.	......	18.23	16.63	16.43	......	13.43	......
26.	......	16.42	16.68	17.03	......	14.78	......
27.	......	17.03	17.03	16.78	......	14.08	......
28.	17.66	17.03	17.48	16.68	......	14.58	......
29.	17.76	18.23	17.23	16.63	......	16.58	......
30.	17.78	17.43	16.98	16.63	......	17.18	......
31.	18.08	......	17.31	16.73	......	17.18	......

*Fall of Mohawk River from Surface of Tailrace ,Little Falls Paper Co.'s Mill, Little Falls, N. Y. to Water Surface Above Rocky Rift Dam.**

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1.	......	.44	.90	......	.80	2.32	1.55
2.	......	.42	1.22	......	.80	2.32	.79
3.	......	.54	.57	......	.80	2.42	.80
4.	......	.59	.64	......	.80	2.52	.97
5.	......	.64	1.92	......	.72	2.52	1.57
6.	......	.67	1.82	......	.72	2.52	2.67
7.	......	.57	1.15	......	.72	2.42	2.64
8.	......	—.11	1.04	.07	.72	2.30	2.70
9.	......	.69	1.42	—.06	.72	2.39	3.27
10.	......	1.12	.44	—.16	.77	2.29	3.07
11.	......	.75	.42	—.21	.74	2.14	2.99
12.	......	.95	.32	—.08	.84	2.14	1.22
13.	......	.40	.37	.34	.79	1.72	1.50
14.	......	.42	.30	.49	.64	1.55	1.05
15.	......	.47	.37	.80	.64	1.50	1.04
16.	......	.22	.45	.92	.77	1.45	1.29
17.	......	.34	.37	.60	.79	1.50	1.14
18.	......	.32	.40	.64	.84	1.20	1.52
19.	......	.40	.32	.84	.79	.55	1.85
20.	......	.50	.37	.67	.94	1.05	1.70
21.	......	1.24	.34	.52	1.37	.37	2.27
22.	......	1.42	.47	.49	1.92	2.59	1 97
23.	......	1.39	.42	.39	2.22	3.52	4.60
24.	......	.85	.49	.69	2.22	3.62	1.45
25.	......	2.22	.52	.64	2.22	3.57	2.39
26.	......	2.80	.42	.65	2.22	4.22	2.25
27.	......	3.97	.62	.75	2.22	5.17	2.24
28.	.62	3.77	.02	.80	2.22	6.47	2.39
29.	.49	3.47	.94	.80	......	6.97	2.17
30.	.59	4.39	.94	.55	......	5.89	1.89
31.	.52	......	.89	.50	......	1.47	......

*Minus sign indicates backwater from dam at foot of section.

Fall of Mohawk River from Herkimer, Gauge No. 24, to Little Falls, Gauge No. 23, Above Gilbert's Dam.

DAY.	1900.			1901.			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	......	11.70	15.20	......	13.80	18 80	13.10
2	......	11.45	12.50	......	14.60	17.70	13.85
3	......	10.95	13.00	......	14.40	17.10	14.65
4	......	......	13.55	......	13.80	16.60	14 35
5	......	......	13.10	......	13.60	15.70	14.80
6	......	12.00	14.00	......	13.40	15.80	15.10
7	......	12.55	13.85	......	13.80	14.80	15.25
8	......	12.80	12.75	13.70	14.40	14.80	15.15
9	......	13.00	12.50	13.35	17.70	19.70	14.70
10	......	12.60	12.80	13.25	14.40	13.10	14.55
11	......	12.25	13.10	13.70	14.45	14.20	14.95
12	......	11.95	12.90	14.20	14.20	14.15	14.65
13	......	11.50	13.50	13.60	14.10	14.10	14.15
14	......	11.40	13.65	13.70	13.35	13.20	13 55
15	......	11.25	13.85	13.40	13.10	12.70	13.20
16	......	11.75	13.55	13.65	12.65	13.20	13.00
17	......	11.85	13.85	14.20	13.10	13.75	13.00
18	......	11.75	13.85	13.95	13.10	14.30	12.75
19	......	11.95	14.95	14.30	13.20	14.90	12.80
20	......	11.75	15.20	14.45	13.45	16.65	13.00
21	......	11.65	15.05	14.85	13.40	17.30	......
22	......	12 95	14.90	14.65	13.35	15.10	......
23	......	13.55	14.50	13.50	13.00	14.10	......
24	......	14.00	13.95	12.70	12.90	14.50	......
25	......	14.35	14.35	12.50	12.70	15.25	......
26	......	15 15	13.90	13.20	12.70	15.75	......
27	......	15.85	13.85	13.45	19.80	15.60	......
28	11.40	15.65	14.10	13.50	18.80	15 60	......
29	11.20	16.00	13.60	14.10	......	15.70	......
30	11.00	15.25	......	14.45	......	16.25	......
31	11.05	......	......	14.30	......	12.85	......

In order to reduce the observed gauge readings and obtain the corresponding rates of discharge, the method outlined below was pursued.

From the well-known Chezy formula.

$$Q = A\,V \qquad (1)$$

$$V = C\sqrt{RS} \qquad (2)$$

$$R = \frac{A}{P} \qquad (3)$$

Q=discharge of stream in second-feet.

A=area of channel cross section, square feet.

V=mean velocity of flow in feet per second.

S=the sine of the surface slope, for which, owing to its small value, the surface slope has been substituted.

R=hydraulic radius or hydraulic mean depth of the channel.

P=wetted perimeter, or circumference of the stream cross section exposed to friction.

C is a variable coefficient.

The lengths of the reaches of the stream covered by the several slope sections are shown in the accompanying table. Using the known elevations of the gauge zeros, a series of tables of mean daily fall from gauge to gauge have been prepared by means of the formula:

Fall=difference of elevation of gauge zeros+reading of upper gauge—reading of lower gauge........................ (4)

These tables show at once the great variations in the rate of fall under varying stages, or when affected by wind, ice, backwater or sudden rising or falling of the stream.

Data was then computed for each section from which a diagram could be prepared showing the value of $\sqrt{S}$ from the formula:

$$S = \frac{F}{L} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

F=fall in feet.

L=constant length of the slope section, feet.

These curves have a range equal to the observed range of variation in fall and from them a second series of tables showing the value of $\sqrt{S}$ for each day were made out.

To determine the area of cross section, wetted perimeter and hydraulic radius, the topographic maps of Mohawk River prepared by the U. S. Board of Engineers on Deep Waterways were available. These maps show cross sections of the stream channel taken at an average interval of 300 feet from Hudson River to Rome. In making the cross section, soundings were taken at average intervals of 25 feet across the channel. The elevations of the stream bed so determined have been reduced to the datum to which the positions of the slope gauges are referred.[a]

To utilize the information at hand in such a manner as to obtain the true mean cross section for each slope section, the average elevation of the stream bed below low-water mark was determined. In doing this every alternate cross section, or in critical locations, every section, was copied from the maps and the average of the soundings taken. In this way the elevations of a series of assumed horizontal cross sections at a large number of points in each slope section were obtained. The average of these has been used as the mean elevation of the stream bed for each slope section. In a similar manner the average width of the stream bed below low-water mark was determined from the cross sections for each slope section.

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[a] The methods of cross sectioning the channel and of taking the Mohawk River soundings are described in a paper by D. J. Howell, C. E., Engineering News, June 21 and June 28, 1900, pp. 418–422.

A third series of tables were prepared from the gauge readings showing the average of the elevations of the water surface at the upper and lower ends of each slope section for each day. This was taken as the elevation of the mean water surface above the mean stream bed previously determined.

The side slopes of the channel above the low-water mark were found to have an average inclination of very nearly 1:1. A series of curves were prepared, one for each slope section, showing the area of cross section corresponding to any mean elevation of water surface as given in the tables. The formula for area of cross section is as follows:

$$A=(W+D)\,D \quad (6)$$

W=width of stream bed, feet.

D=difference of elevation of stream bed and mean water surface, feet.

A series of values of the wetted perimeter of the cross section were then found by the formula.

$$P=W+2\sqrt{2}\,D+\tfrac{1}{2}(W+2\,D) \quad (7)$$

The fraction $\frac{1}{2}$ (W + 2 D), represents one-half of the area of the exposed water surface, which was added to the perimeter in earth to allow for the effect of wind and air friction in open weather, and of friction on the ice coating when the stream surface was frozen. The proper value for this quantity is quite uncertain, as to the extent to which the stream was frozen over varied greatly at different times. From the gauge readers' reports it was found that there were marginal strips of ice along both banks during several months of the winter season, the width of the strips increasing so as to cover the entire surface on mill-ponds or elsewhere that the current was sluggish, and diminishing in extent over rifts or through narrows. The fraction $\frac{1}{2}$ was selected as best representing the average condition during the entire period while the gaugings were being kept. Finally a diagram was prepared for each slope-section showing values of R for any elevation of the mean water surface.

The value of the coefficient C varies with the slope and hydraulic radius. It is also a function of the general character of the stream channel, including the roughness of the material composing the stream bed, the frequency of bends, their abruptness, the occurrence of islands or sudden changes in cross section, the presence of aquatic plants, etc. These factors are all summed up in terms of the " degree of roughness," of the channel, usually expressed by the letter n. This has been assigned the value of 0.0325. The stream during high water being considered as having fairly good regimen when expressed in terms of the usual hydraulic scale, so that n=.030 would apply to the better slope sections, which only have been computed. When obstructed with ice or during low water n=.035 could properly be used. For the sake of uniformity the mean of the two values has been adopted. To determine C the diagram of Hering and Trautwine was used.[a]

Having given the fall and the elevation of the mean water surface for each day, it was only necessary to take from the diagrams the values of the factors A, C, $\sqrt{R}$, and S, which when multiplied together, give the rate of discharge. The labor of this multiplication was greatly lessened by the use of Crelle's tables.[b]

The discharge has been calculated only for those slope sections considered to possess the most perfect regimens. Owing to variations in the area of cross section, irregularities in the stream channel, etc., the surface slope is much more nearly uniform for high water than for lower stages, and the results of the calculations are proportionately more reliable. As noted above, gauge readings in winter were taken to the surface of water rising in a hole through the ice. It has not been found practicable to correct the stream cross sections by deducting the thickness of ice below water surface as should properly be done.

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[a] Flow of water, etc., Ganguillet and Kutter, translated by Rudolph Hering and John C. Trautwine.

[b] Rechentafeln, by A. L. Crelle, containing the products of all factors from 1 to 1,000.

DISCHARGE FROM SLOPE GAUGINGS.

In the final computations it was found to be impracticable to calculate the flow of Mohawk River for each day, or in fact for any but extreme high water stages from the slope gaugings. The presence of slack water in bays and eddies and of rifts and sudden changes of slope during low or moderate stages make the apparent cross-section and surface slope much greater than the effective grade and section. With the increased cross-section and velocity due to high water these sources of error largely disappear, and the results of the calculations may in general be relied upon as being fairly accurate.

The slope gaugings were originally established by the Barge Canal Survey in 1900 for the purpose of determining the freshet discharge of the Lower Mohawk.

The calculated discharge during several high water periods is given below and is of interest in reference to the effect of floods on barge canals. The tables of mean daily elevation of water surface and fall of Mohawk River from gauge to gauge are also useful in showing the development and progress of floods.

High Water Discharge of Mohawk River; Estimated from Gauging of Surface Slope.
St. Johnsville—Canajoharie Section.
[Mean Drainage area, 1,775 square miles.]
FLOOD OF NOVEMBER 27, 1900.

1900.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
November 25	4,500	2.5
November 26	15,480	8.7
November 27	17,320	9.7
November 28	16,100	9.1
November 29	9,280	5.2
November 30	6,970	3.9

High Water Discharge of Mohawk River; Estimated from Gauging of Surface Slope.
St. Johnsville—Canajoharie Section—(Concluded).

FLOOD OF MARCH 27, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
March 25	15,842	8.9
March 26	15,576	8.8
March 27	21,376	12.0
March 28	19,442	10.9
March 29	12,628	7.1

FLOOD OF APRIL 8, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
April 8	12,312	6.9
April 9	11,745	6.6
April 10	10,449	5.9

High Water Discharge of Mohawk River; Estimated from Gauging of Surface Slope.
Canajoharie—Yost's Section.

[Mean drainage area, 1,933 square miles.]

FLOOD OF NOVEMBER 27, 1900.

1900.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
November 27	18,271	9.4
November 28	18,088	9.3
November 29	12,948	6.7

FLOOD OF MARCH 27, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet. per square mile.
March 24	15,038	7.8
March 25	15,184	7.9
March 26	14,364	7.4
March 27	25,860	13.4
March 28	27,110	14.0
March 29	15,504	8.0

High Water Discharge of Mohawk River; Estimated from Gauging of Surface Slope.
[*Canajoharie—Yost's Section*—(Concluded).

FLOOD OF APRIL 8, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet	Second-feet per square mile.
April 6	12,865	6.7
April 7	14,553	7.5
April 8	16,656	8.6
April 9	15,554	8.0
April 10	13,797	7.1

High Water Discharge of Mohawk River Estimated from Gaugings of Surface Slope.
Fort Hunter—Amsterdam Section.

[Mean drainage area, 3,145 square miles.]

FLOOD OF NOVEMBER 27, 1900.

1900.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
November 26	14,580	4.6
November 27	17,763.5	5.6
November 28	14,022	3.3
November 29	8,341	2.7

FLOOD OF MARCH 27, 1901.

1901	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
March 24	12,597	4.0
March 25	11,460	3.6
March 26	17,660	5.6
March 27	25,515	8.1
March 28	23,206	7.4
March 29	14,420	4.6

FLOOD OF APRIL 8, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
April 6	14,535	4.6
April 7	19,000	6.0
April 8	21,625	6.9
April 9	16,385	5.2
April 10	13,132	4.2

High Water Discharge of Mohawk River: Estimated from Gaugings of Surface Slope. Fort Hunter—Amsterdam Section—(Concluded).

FLOOD OF APRIL 22, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
April 20	8,610	2.7
April 21	13,695	4.4
April 22	32,276	10.3
April 23	28,060	8.9
April 24	19,404	6.2
April 25	24,075	7.7
April 26	17,068	5.4

High Water Discharge of Mohawk River Estimated from Gaugings of Surface Slope. Rexford Flats—Vischer's Ferry Section.

[Mean drainage area, 3,396 square miles.]

FLOOD OF NOVEMBER 27, 1900.

1900.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
November 26	14,787	4.3
November 27	30,176	8.9
November 28	27,018	6.1

FLOOD OF MARCH 27, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	second-feet. per square mile.
March 25	20,041	5.9
March 26	31,800	9.3
March 27	....	....
March 28	37,288	11.0
March 29	27,650	8.1

FLOOD OF APRIL 9, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
April 7	36,079	10.6
April 8	37,366	11.0
April 9	37,848	11.1
April 10	38,533	11.3

High Water Discharge of Mohawk River; Estimated from Guagings of Surface Slope. Rexford Flats—Vischer's Ferry Section—(Concluded).

FLOOD OF APRIL 22, 1901.

1901.	ESTIMATED DISCHARGE.	
	Second-feet.	Second-feet per square mile.
April 21	17,955	5.2
April 22	60,990	17.93
April 23	45,966	13.4
April 24	41,250	12.1

UPPER HUDSON RIVER DRAINAGE.

INDIAN RIVER AT INDIAN LAKE DAM, HAMILTON COUNTY, N. Y.

Indian River, a tributary of the Upper Hudson, contains a precipitous forested mountain area of 146 square miles, in eastern Hamilton county. In 1898 a masonry storage dam was built at the foot of Indian Lake, replacing the lumberman's dam which was formerly there, and raising the level of the artificial lake so formed 23 feet. The storage capacity of the present lake is 5,000,000,000 cubic feet. The area of the water surface of the lake is 5,035 acres, and the elevation of the spillway crest above mean tide is 1,650 feet. The dam was built by a federation of water-power users on the Hudson River, in co-operation with the State of New York, the primary object being to store flood water from this drainage area to be turned into the Hudson during the low water period of each year, thereby equalizing the flow to some extent. Water is also used for sluicing logs during the river driving season.[a]

Since July 22, 1900, a gauging record has been kept at the dam, with a view to determining the total outgo from this reservoir; the facts recorded being the elevation of the water surface in the reservoir, depth of water flowing over the spillway or flashboards, width of opening and head on the main and subsidiary logways, and the width of opening of each of the five-foot sluice gates, together with the effective head on the openings.

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[a] See Engineering News, May 18, 1899.

These facts will enable a calculation of the outflow from the reservoir to be made, and, by comparison with gauging records kept on Hudson River at Fort Edward and Mechanicville, the effect of storage on the low water flow of the Hudson can be determined.

A meteorological station has been established at the dam by the United States Weather Bureau, including rainfall, temperature and other records. The regimen of flow of Indian River below the dam is largely artificial, though in the course of a year or more the total annual run-off of the drainage area will appear in the stream, and it is hoped in the course of time to determine the relation between the rainfall and run-off of what constitutes rather a typical Adirondack Watershed.

When the reservoir is full, the excess of inflow passes over the spillway, which has a level crest 106.05 feet long in the clear. To facilitate the calculation of discharge over this spillway, a series of experiments were made at Cornell University, June 6, 1899, on a full-sized model of the spillway section, 6.58 feet long, from which the proper coefficients of discharge have been determined.[a]

The discharge through the two 5-foot sluice gates, provided as a means for drawing the water down as required, is calculated from the observed head and from the area of the lune-shaped gate orifices by the ordinary formula. The value of the coefficients of discharge to be applied may be checked by current meter measurements made at a convenient bridge below the dam. The results of these calculations will be somewhat uncertain until the reservoir is cleared of drift which tends to obstruct the gate openings during low water.

A measurement of the flow at this point on October 19, 1900, showed the rate of draught from the reservoir to be 541 second-feet, both sluice-gates being full opened under an effective head of 6.25 feet, but apparently somewhat clogged by drift. Until additional measurements can be made under more favorable conditions, the flow through the sluice-gates will be calculated by means of the formula for orifices, using the ordinary coefficient 0.62.

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[a] Transactions Am. Soc. C. E. Vol. XLIV, p. 283.

A measurement of the Hudson River at Mechanicville, made on the afternoon of the following day, October 20, 1900, showed the total flow at that point to be 1,871 second-feet.

The following tables show the stage of and draught from Indian Lake Reservoir during the present year, the depth being measured with reference to the inverts of the 5-foot discharge tunnels as a datum. The estimated storage capacity of the reservoir at different depths is as follows:

	Elevation.	Area, acres.	Storage, cubic feet.
Original Lake	1,616.17	1,000	....
Lumberman's dam	1,627	3,007	800,000,000
Crest present dam	1,650	5,035	4,468,000,000
Top flashboards present dam	1,651.1	....	5,000,000,000

Stage of Water in Indian Lake Reservoir, Hamilton County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	.....	.....	.....	.....	.....	.....	.....	29.42	25.01	16.00	8.62	.....
2	.....	.....	.....	.....	.....	.....	.....	29.17	25.00	15.75	8.37	9.50
3	.....	.....	.....	.....	.....	.....	.....	28.92	24.83	15.46	8.17	.....
4	.....	.....	.....	.....	.....	.....	.....	28.75	24.58	15.17	8.00	.....
5	.....	.....	.....	.....	.....	.....	.....	28.58	24.33	14.87	7.79	.....
6	.....	.....	.....	.....	.....	.....	.....	28.33	24.17	14.58	7.58	.....
7	.....	.....	.....	.....	.....	.....	.....	28.25	23.92	14.42	7.42	.....
8	.....	.....	.....	.....	.....	.....	.....	28.08	23.58	14.08	7.33	.....
9	.....	.....	.....	.....	.....	.....	.....	27.92	23.29	13.79	7.33	10.25
10	.....	.....	.....	.....	.....	.....	.....	27.83	22.00	13.50	7.29	.....
11	.....	.....	.....	.....	.....	.....	.....	27.67	22.71	13.21	7.25	.....
12	.....	.....	.....	.....	.....	.....	.....	27.33	22.37	12.92	7.17	10.42
13	.....	.....	.....	.....	.....	.....	.....	27.29	21.00	12.67	7.00	.....
14	.....	.....	.....	.....	.....	.....	.....	27.25	21.63	12.42	6.87	.....
15	.....	.....	.....	.....	.....	.....	.....	27.21	21.25	12.25	6.71	.....
16	.....	.....	.....	.....	.....	.....	.....	27.12	20.88	12.08	6.50	10.75
17	.....	.....	.....	.....	.....	.....	.....	27.00	20.50	11.83	6.33	.....
18	.....	.....	.....	.....	.....	.....	.....	27.00	20.08	11.54	6.17	10.83
19	.....	.....	.....	.....	.....	.....	.....	27.00	19.75	11.25	6.08	.....
20	.....	.....	.....	.....	.....	.....	.....	27.00	19.42	11.00	6.33	.....
21	.....	.....	.....	.....	.....	.....	.....	27.00	19.17	10.79	6.50	.....
22	.....	.....	.....	.....	.....	.....	33.50	27.00	18.87	10.54	6.58	11.08
23	.....	.....	.....	.....	.....	.....	33.00	26.92	18.54	10.33	6.58	.....
24	.....	.....	.....	.....	.....	.....	32.50	26.75	18.25	10.12	.....	11.25
25	.....	.....	.....	.....	.....	.....	32.17	26.63	17.92	9.96	.....	.....
26	.....	.....	.....	.....	.....	.....	31.92	26.37	17.58	9.79	.....	11.58
27	.....	.....	.....	.....	.....	.....	31.25	26.17	17.25	9.58	.....	.....
28	.....	.....	.....	.....	.....	.....	30.83	26.00	16.92	9.38	.....	.....
29	.....	.....	.....	.....	.....	.....	30.42	25.83	16.67	9.17	.....	11.83
30	.....	.....	.....	.....	.....	.....	30.08	25.58	16.33	8.96	9.25	.....
31	.....	.....	.....	.....	.....	.....	29.75	25.33	.....	8.83	.....	12.08
1901.												
1	12.17	9.63	2.92	8.58	30.42	35.75	35.25	32.25	31.08	25.92	23.25	17.00
2	12.25	9.42	.....	8.92	30.83	35.75	35.21	32.17	30.92	25.92	22.92	16.83
3	.....	9.25	2.42	9.25	31.17	35.75	35.17	32.08	30.75	25.87	22.58	16.50
4	.....	.....	.....	9.50	31.42	35.67	35.17	32.00	30.58	25.58	22.35	16.17
5	12.33	8.83	.....	9.83	31.67	35.50	35.17	32.04	30.42	25.17	21.92	16.87
6	.....	.....	1.83	10.08	31.92	35.33	35.17	32.08	30.25	24.75	21.58	15.58
7	.....	.....	.....	10.50	32.00	35.33	35.17	32.08	30.08	24.33	21.25	15.29
8	12.50	8.08	.....	11.00	32.08	35.33	35.17	32.08	29.87	24.00	20.92	15.00
9	12.58	.....	.....	11.50	32.17	35.25	35.17	32.17	29.58	23.67	20.58	14.71
10	.....	7.75	1.33	11.92	32.25	35.17	35.17	32.33	29.33	23.33	20.25	14.58
11	.....	.....	1.17	12.25	32.50	35.08	35.17	32.42	29.08	23.00	19.92	14.50
12	.....	.....	2.92	12.67	32.75	35.00	35.17	32.50	28.75	22.75	19.67	14.54
13	12.08	7.17	3.08	13.17	33.08	34.92	35.21	32.58	28.50	22.50	19.42	14.71
14	.....	.....	3.25	13.67	33.25	34.83	35.25	32.67	28.25	22.50	19.33	14.92
15	.....	.....	.....	14.50	33.33	34.75	35.25	32.67	28.00	22.58	19.42	16.50
16	11.83	6.42	.....	15.17	33.42	34.67	35.25	32.71	27.87	22.75	19.50	17.50
17	.....	.....	3.75	16.00	33.50	34.58	35.33	32.79	27.92	22.92	19.54	18.08
18	.....	.....	.....	17.00	33.75	34.67	35.08	32.83	28.00	23.00	19.58	18.42
19	11.50	5.67	.....	17.83	33.92	34.75	34.83	32.87	28.04	23.08	19.63	18.75
20	.....	.....	4.00	18.50	34.17	34.83	34.58	32.87	28.08	23.25	19.67	18.87
21	11.33	.....	4.25	19.67	34.33	34.92	34.33	33.00	28.12	23.33	19.71	19.00
22	.....	4.92	4.50	22.00	34.50	35.08	34.00	32.75	28.17	23.42	19.75	19.12
23	.....	.....	4.75	24.17	34.75	35.25	33.75	32.58	28.17	23.58	19.58	19.25
24	11.00	.....	5.00	25.25	34.92	35.25	33.50	32.50	28.00	23.67	19.25	19.33
25	.....	4.17	5.25	26.33	35.08	35.25	33.25	32.33	27.67	23.71	18.92	19.42
26	.....	.....	5.58	27.17	35.25	35.25	33.08	32.17	27.25	23.75	18.58	19.50
27	10.50	.....	6.33	28.00	35.33	35.25	32.92	32.00	26.87	23.79	18.25	19.58
28	.....	3.42	6.83	28.58	35.42	35.25	32.75	31.87	26.50	23.83	18.00	19.71
29	10.17	.....	7.42	29.17	35.50	35.25	32.50	31.58	26.00	23.92	17.67	19.83
30	.....	.....	7.83	29.75	35.67	35.25	32.33	31.42	25.75	23.92	17.33	19.92
31	9.83	.....	8.17	.....	35.75	.....	32.33	31.25	.....	23.58	.....	20.00

Stage of Water in Indian Lake Reservoir, at Indian Lake, Hamilton County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	20.08	18.79	15.00	29.92	36.17	35.54	36.25	34.88	31.92	28.92	29.08	25.58
2	20.17	18.75	15.42	30.33	36.17	35.54	36.29	34.79	31.75	28.75	28.83	25.67
3	20.21	18.71	16.17	30.58	36.17	35.58	36.33	34.75	31.58	28.58	28.58	25.79
4	20.21	18.67	16.67	30.83	36.13	35.58	36.46	34.67	31.38	28.42	28.33	25.92
5	20.25	18.63	17.08	31.08	36.08	35.58	36.42	34.58	31.17	28.33	28.08	26.00
6	20.29	18.58	17.42	31.25	36.00	35.58	36.29	34.67	31.00	28.50	27.92	26.00
7	20.33	18.54	17.75	31.42	35.79	35.63	36.13	34.75	30.83	28.17	27.75	25.83
8	20.33	18.50	18.00	31.58	35.63	35.67	36.00	34.83	30.71	28.17	27.67	25.67
9	20.37	18.46	18.17	32.08	35.50	35.67	35.88	34.83	30.75	28.21	27.75	25.50
10	20.42	18.42	18.33	33.00	35.42	35.67	35.79	34.75	30.88	28.25	27.83	25.33
11	20.42	18.37	18.50	33.50	35.33	35.67	35.63	34.75	30.79	28.33	27.92	25.17
12	20.33	18.33	18.83	33.75	35.17	35.67	35.50	34.67	30.54	28.37	28.00	25.08
13	20.25	18.29	19.17	34.00	35.00	35.67	35.42	34.58	30.29	28.42	28.17	25.00
14	20.12	18.25	19.75	34.25	34.92	35.71	35.42	34.54	30.33	28.50	28.37	25.08
15	20.08	18.17	20.25	34.42	34.83	35.75	35.50	34.46	30.33	28.50	28.21	25.17
16	19.00	17.92	20.67	34.58	34.75	35.75	35.67	34.38	30.33	28.46	28.04	25.33
17	19.92	17.58	21.83	34.71	34.63	35.75	35.63	34.33	30.38	28.42	27.83	25.50
18	19.79	17.21	22.92	34.83	34.50	35.75	35.54	34.25	30.42	28.42	27.67	25.67
19	19.67	16.92	23.58	35.00	34.42	35.79	35.50	34.17	30.46	28.42	27.50	25.83
20	19.58	16.67	24.00	35.00	34.38	35.79	35.58	34.00	30.50	28.42	27.33	25.83
21	19.50	16.42	24.33	34.96	34.33	35.83	35.75	33.83	30.54	28.42	27.17	25.83
22	19.50	16.25	24.58	34.92	34.25	35.83	35.92	33.71	30.54	28.46	27.00	25.92
23	19.50	16.00	24.83	34.92	34.33	35.83	35.92	33.58	30.42	28.50	26.83	26.00
24	19.42	15.75	25.17	34.96	34.54	35.88	35.75	33.42	30.17	28.58	26.67	26.00
25	19.33	15.50	25.42	35.00	34.67	35.92	35.58	33.21	29.88	28.75	26.50	26.00
26	19.25	15.25	25.67	35.25	34.92	35.96	35.42	33.00	29.67	28.92	26.33	25.92
27	19.17	15.00	26.00	35.42	35.08	36.08	35.38	32.83	29.50	29.08	26.17	25.75
28	19.08	14.83	26.50	35.50	35.25	36.17	35.25	32.67	29.33	29.30	26.00	25.63
29	19.00	.....	27.33	35.50	35.33	36.17	35.17	32.50	29.17	29.42	25.83	25.42
30	18.92	.....	28.50	36.00	35.38	36.17	35.08	32.25	29.04	29.42	25.67	25.29
31	18.83	.....	29.25	.....	35.50	.....	34.96	32.08	.....	29.37	.....	25.17

SCHROON RIVER AT WARRENSBURG, WARREN COUNTY, N. Y.

A gauging record was established at the dam of Schroon River Pulp Company, two miles below Warrensburg, November 1, 1895, in connection with Upper Hudson Storage Survey.[a] Conditions at the Warrensburg gauging station are somewhat peculiar. During ordinary water an attempt is made to turn the entire flow of the stream, less leakage, through the water wheels, which run 24 hours per day, Sundays excepted. This is accomplished by the use of flashboards and by draught from the storage impounded by Starbuckville dam. During extreme low water the mill is shut down altogether. As a rule, no water passes over the dam at this time, the entire flow leaking through. A balance is maintained between the inflow and outgo by fluctuations in the pond level, thereby varying the pond storage and also the head on the leaks. As no record is kept when the mill is not running, it has been necessary to estimate the low water flow, which was taken at 150 second-feet in 1899, this being the assumed leakage of the Starbuckville dam.[b]

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[a] See report of State Engineer and Surveyor of New York, 1895, p. 118; also Water Supply and Irrigation Paper No. 35, p. 58.

The apparently uniform regimen of the stream during considerable periods of time may partly be accounted for as the result of draught and storage from the Starbuckville dam.

A current meter measurement of the leakage of the dam, flume, and flashboards, at the Schroon River Pulp Company's Mill was made on August 9, 1900, in the open channel about one-half mile below the dam. The flow at this point was found to be 285 second-feet. This amount has been taken as the low water flow and leakage during 1900 and 1901. The dam is of timber, and was considered nearly water-tight when built. There is evidence that the leakage has increased year by year.

The flow over the dam, without flashboards, has been taken from a diagram, which was deduced from experiments made at Cornell University, on a weir having a similar cross section. The flow over flashboards has been calculated by means of the Francis formula.

During 1901, the station has been equipped with new standard board gauges. Readings are taken once each day and the record is furnished by Mr. Frank Goodfellow.

High-Water Discharge from Schroon River at Warrensburg, Warren County, N. Y.

DATE.	Year.	MAXIMUM DISCHARGE.	
		Second-feet.	Second-feet per square mile.
December 30–31	1895	4,074	7.21
April 20	1896	7,109	12.58
April 19	1897	3,982	7.05
March 14–19	1898	4,044	7.16
April 24–30	1899	5,103	9.03
April 22	1900	7,745	13.71
April 16	1901	6,802	10.32
March 21	1902	7,042	12.51

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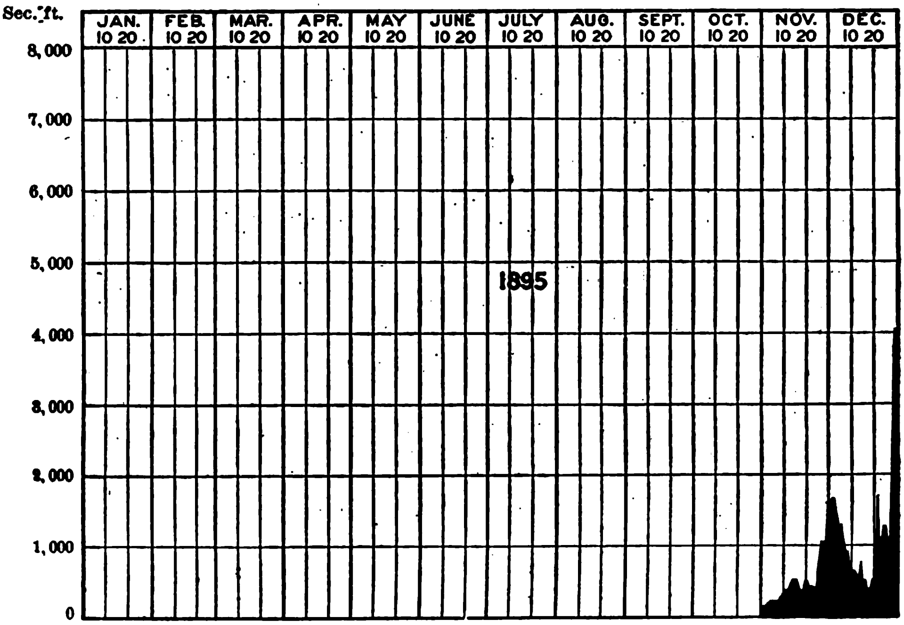
[b] See report of the Merchants' Association of New York on the Water Supply of the City of New York, p. 337.

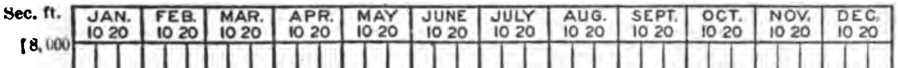
Mean Daily Flow in Second-feet of Schroon River at Warrensburg, Warren County, N. Y.
[Drainage area, 563 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1899.												
1	*641	478	478	708	4,854	1,506	304	150	150	*381	1,468	708
2	641	478	478	*708	4,854	1,506	*304	150	150	381	1,468	708
3	641	478	478	708	4,854	1,506	304	150	*150	381	1,468	*708
4	641	478	478	708	4,854	*1,367	304	150	150	381	1,468	708
5	641	*478	*478	708	4,854	1,228	304	150	150	478	*1,468	708
6	641	478	478	708	4,854	1,228	304	*150	150	478	1,468	708
7	608	478	478	708	*4,487	1,228	304	150	150	478	1,468	708
8	*575	478	478	708	4,121	1,228	304	150	150	*478	1,468	708
9	575	478	478	*1,999	4,121	1 228	*304	150	150	478	1,318	708
10	575	478	478	3,291	4,121	1,228	304	150	*150	478	1,318	*708
11	575	478	478	3,291	4,121	*1,228	304	150	150	478	1,171	708
12	575	*478	*478	3,291	4,121	1,228	304	150	150	478	*1,106	708
13	575	478	478	3,291	3,493	1,228	150	*150	150	478	1,041	931
14	608	478	478	3,291	*3,307	1,228	150	150	150	478	983	983
15	*641	478	478	3,291	3,121	1,228	150	150	150	*478	901	1,041
16	641	478	478	*3,362	3,121	1,228	*150	150	150	478	861	1,101
17	641	478	478	3,443	2,931	1,228	150	150	*150	478	841	*1,127
18	641	478	550	3,443	2,931	*1,228	150	150	150	478	841	1,153
19	641	* 478	*641	3,443	2,931	1,228	150	150	150	478	*841	1,153
20	641	478	641	3,443	2,381	1,228	150	*150	381	478	841	1,153
21	608	478	641	3,443	*2,181	1,228	150	150	381	478	841	1,153
22	*575	478	641	3,443	1,981	1,228	150	150	381	*478	841	1,153
23	575	478	641	*4,273	1,981	1,228	*150	150	381	478	841	1,153
24	575	478	718	5,103	1,981	970	150	150	*381	478	841	*1,153
25	575	478	718	5,103	1,981	*675	150	150	381	478	841	1,153
26	575	*478	*718	5,103	1,981	381	150	150	381	478	*774	1,153
27	575	478	718	5,103	1,506	381	150	*150	381	478	708	1,101
28	575	478	718	5,103	*1,448	381	150	150	381	478	708	1,101
29	*575	......	718	5,103	1,391	381	150	150	381	*478	708	1,041
30	575	......	718	*5,103	1,391	381	*150	150	381	478	708	1,041
31	575	......	718	......	1,391	......	150	150	......	478	......	*1,041
Mean	606	478	564	2,877	3,150	1,093	210	150	234	462	1,047	948
1900.												
1	810	810	1,360	*1,162	3,965	1,085	885	285	285	285	517	939
2	810	810	1,290	1,215	2,885	1,217	810	285	*285	535	517	*285
3	810	810	1,230	1,315	2,625	*1,349	810	285	285	535	517	989
4	810	*810	*1,204	1,395	2,305	1,565	810	285	285	535	*285	989
5	810	810	1,178	1,535	2,155	1,990	*810	*285	285	517	535	989
6	810	810	1,140	1,535	*2,045	1,890	810	285	285	517	535	989
7	*810	810	1,123	1,741	1,935	1,890	810	285	285	*285	535	989
8	810	810	1,123	*1,947	1,748	1,890	810	285	285	535	517	989
9	810	810	1,123	2,155	1,715	1,890	616	285	*285	535	517	*285
10	810	810	1,123	2,155	1,725	*1,725	616	285	285	535	517	989
11	810	*1,620	*1,123	2,155	1,715	1,565	616	285	285	517	*285	989
12	810	1,665	1,123	2,225	1,715	1,425	*616	*285	285	517	535	989
13	810	1,165	1,123	2,305	*1,670	1,300	616	806	285	517	535	989
14	*810	1,945	1,123	2,465	1,625	1,290	616	806	285	*285	535	989
15	810	1,945	1,123	*2,765	1,605	1,300	616	806	285	535	517	989
16	810	1,945	1,123	3,065	1,585	1,300	539	806	*285	535	517	*285
17	810	1,945	1,123	3,365	1,545	*1,187	539	806	285	535	517	788
18	810	*1,892	*1,120	3,545	1,535	1,075	539	806	285	517	*285	788
19	810	1,840	1,117	4,115	1,525	963	*365	*285	285	517	401	788
20	810	1,795	1,107	5,365	*1,470	963	365	806	285	517	535	788
21	*810	1,710	1,100	7,010	1,415	963	285	806	285	*285	535	788
22	810	1,608	1,089	*7,745	1,375	963	285	806	285	535	535	788
23	810	1,608	1,085	6,945	1,355	963	285	806	*285	535	574	*285
24	810	1,608	1,085	6,945	1,295	*963	285	612	285	535	285	285
25	810	*1,571	*1,085	6,210	1,295	963	285	612	285	517	*285	788
26	810	1,535	1,085	6,685	1,125	963	*285	*285	285	517	806	788
27	810	1,475	1,155	6,315	*1,025	963	285	285	285	517	806	788
28	*810	1,435	1,130	5,365	1,085	963	285	285	285	*285	806	788
29	810	......	1,110	*5,095	1,085	963	285	285	285	535	806	788
30	810	......	1,110	4,825	1,085	963	285	285	*285	535	806	*285
31	810	......	1,110	......	1,085	......	285	285	......	535	......	788
Mean	810	1,380	1,140	3,688	1,688	1,280	528	474	285	488	530	773

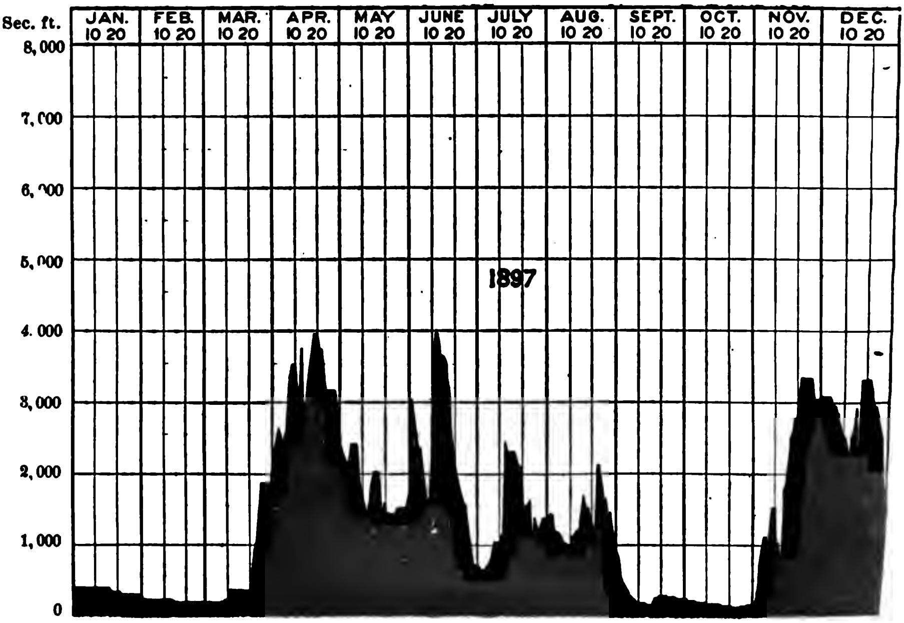
*Sunday.



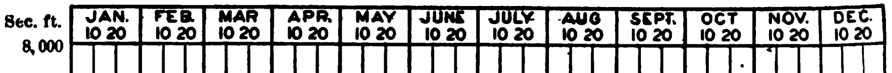
Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1895.



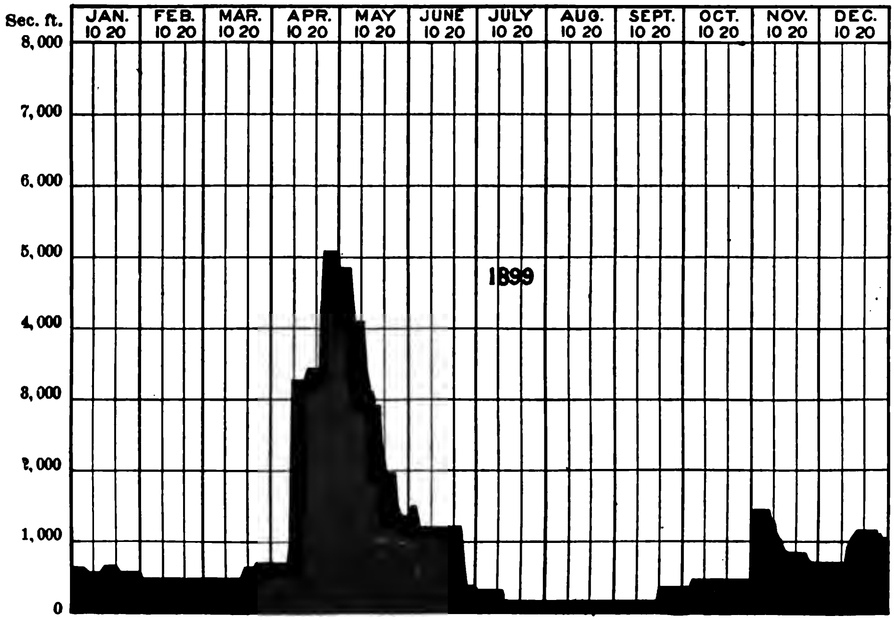
Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1896.



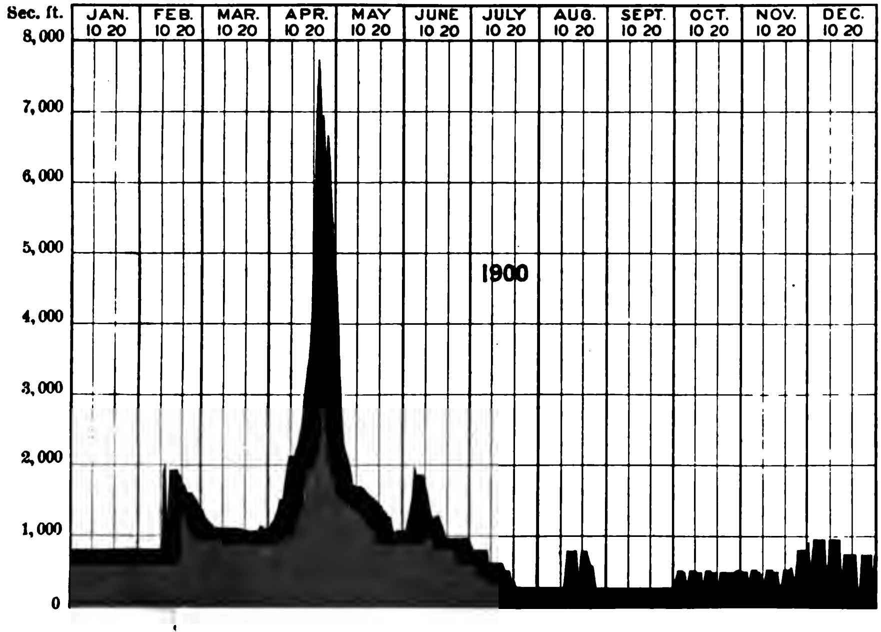
Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1897.



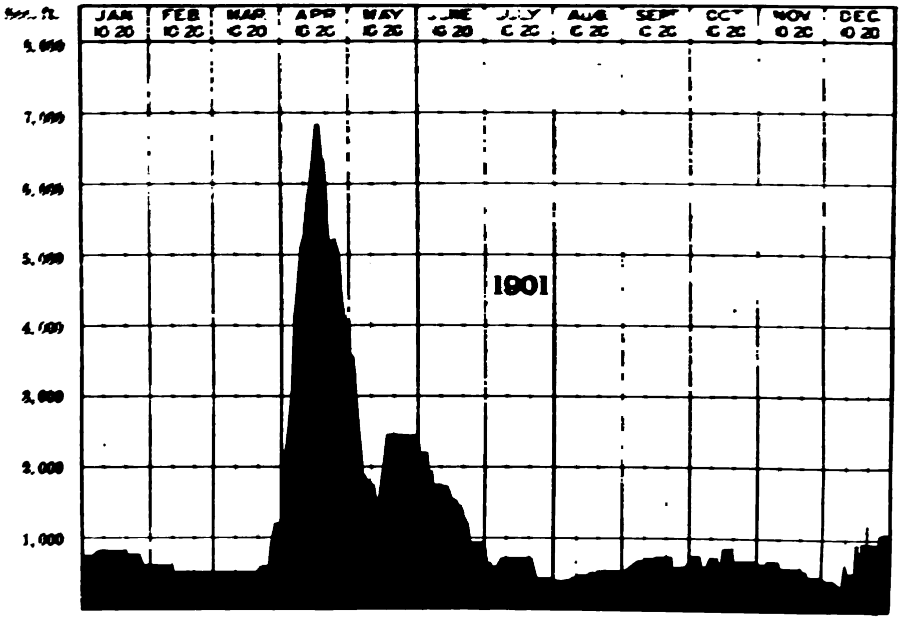
Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1898.



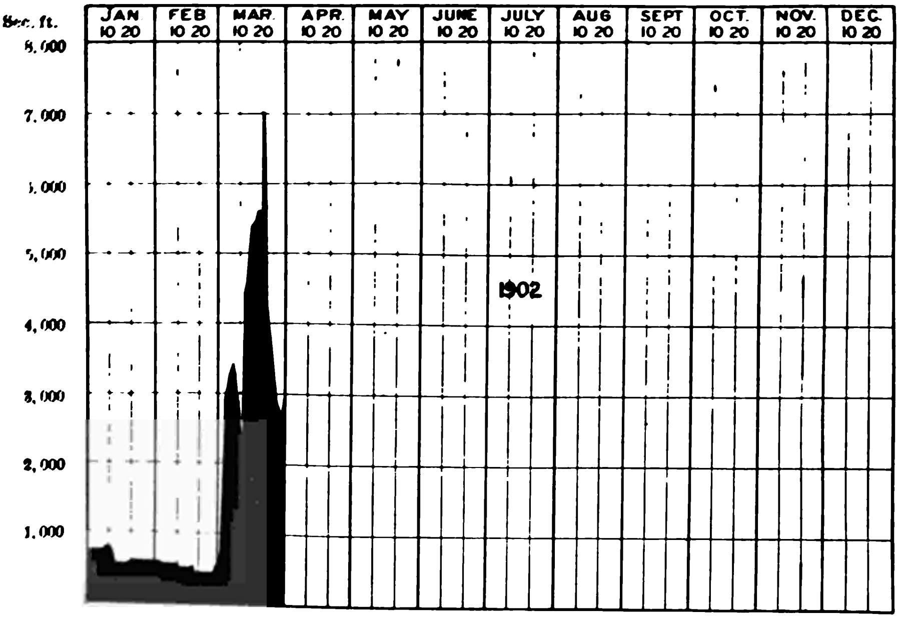
Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1899.



Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1900.



Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1901.



Discharge of Schroon River at Warrensburg, Warren County, N. Y., 1902.

Mean Daily Flow in Second-feet of Schroon River at Warrensburg, Warren County, N. Y.

[Drainage area, 563 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	768	612	535	1,702	2,952	2,282	671	415	*535	729	667	*
2	768	612	535	1,992	2,752	*	671	415	555	729	667	430
3	768	*	*	2,452	2,622	2,292	671	415	575	729	*	413
4	768	612	535	3,152	2,152	2,292	633	*415	595	729	612	430
5	768	612	535	3,732	*	1,932	633	415	635	729	684	430
6	*	612	535	4,132	1,992	1,932	633	425	635	*	684	430
7	834	612	535	*	1,932	1,932	*	425	675	594	684	389
8	834	612	535	4,552	1,872	1,792	729	425	*675	594	684	*
9	834	612	535	5,087	1,812	*	729	445	675	594	684	353
10	834	*	*	5,222	1,742	1,792	729	445	675	729	*	353
11	834	535	535	5,352	1,742	1,762	729	*445	695	729	......	566
12	834	535	535	5,652	*	1,742	729	475	695	729	592	566
13	*	535	535	5,967	1,512	1,742	729	475	695	*	592	566
14	834	535	535	*	1,552	1,662	*	475	695	594	592	566
15	834	535	535	6,302	1,782	1,592	.....	475	*715	612	592	*
16	834	535	535	6,852	2,092	*	729	495	715	806	592	939
17	834	*	*	6,797	2,472	1,532	729	515	715	806	*	806
18	834	535	535	6,302	2,472	1,462	729	*515	715	806	592	806
19	834	535	535	5,967	*	1,412	729	515	715	806	592	939
20	*	535	535	5,652	2,282	1,342	729	515	715	*	592	939
21	768	535	535	*	2,472	1,282	*	515	715	351	592	939
22	768	535	614	5,087	2,472	1,232	594	535	*715	678	535	*
23	768	535	614	5,222	2,472	*	501	535	497	678	535	939
24	768	*	*	5,352	2,432	939	430	535	594	678	*	939
25	768	535	614	5,087	2,432	939	430	*535	594	678	477	......
26	768	535	939	4,967	*	939	430	535	594	678	477	1,027
27	*	535	1,064	4,552	2,472	939	430	535	594	*	477	1,072
28	612	535	1,207	*	2,472	939	*	535	594	678	477	1,072
29	612	......	1,207	4,052	2,472	939	430	535	*	678	477	*
30	612	......	1,207	3,250	2,472	*939	430	535	632	678	477	1,006
31	612	......	*	......	2,432	......	430	535	.....	678	......	939
Mean...	774	561	658	4,786	2,235	1,522	617	481	650	685	588	714
1902.												
1	761	612	740	......	......	......	......	......	......	......	......	......
2	761	*	*	......	......	......	......	......	......	......	......	......
3	761	574	2,957	......	......	......	......	......	......	......	......	......
4	761	574	3,052	......	......	......	......	......	......	......	......	......
5	*	574	3,287	......	......	......	......	......	......	......	......	......
6	761	574	3,392	......	......	......	......	......	......	......	......	......
7	761	574	3,482	......	......	......	......	......	......	......	......	......
8	806	574	3,287	......	......	......	......	......	......	......	......	......
9	806	*	*	......	......	......	......	......	......	......	......	......
10	806	574	2,582	......	......	......	......	......	......	......	......	......
11	768	535	2,377	......	......	......	......	......	......	......	......	......
12	*	535	4,462	......	......	......	......	......	......	......	......	......
13	574	535	4,652	......	......	......	......	......	......	......	......	......
14	574	535	5,087	......	......	......	......	......	......	......	......	......
15	574	535	5,397	......	......	......	......	......	......	......	......	......
16	574	*	*	......	......	......	......	......	......	......	......	......
17	574	574	5,497	......	......	......	......	......	......	......	......	......
18	574	477	5,647	......	......	......	......	......	......	......	......	......
19	*	477	5,647	......	......	......	......	......	......	......	......	......
20	612	477	5,497	......	......	......	......	......	......	......	......	......
21	612	477	7,042	......	......	......	......	......	......	......	......	......
22	612	477	4,342	......	......	......	......	......	......	......	......	......
23	612	*	*	......	......	......	......	......	......	......	......	......
24	612	477	3,732	......	......	......	......	......	......	......	......	......
25	612	477	3,352	......	......	......	......	......	......	......	......	......
26	*	477	3,152	......	......	......	......	......	......	......	......	......
72	612	535	2,902	......	......	......	......	......	......	......	......	......
28	612	535	2,792	......	......	......	......	......	......	......	......	......
39	612	......	2,712	......	......	......	......	......	......	......	......	......
30	612	......	*	......	......	......	......	......	......	......	......	......
31	612	......	3,052	......	......	......	......	......	......	......	......	......
Mean...	664	532	3,851	......	......	......	......	......	......	......	......	......

*Sunday.

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

[illegible] on Drainage Area.

Month	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.
January	....	5.71	6.69	1.75	1.25	1.66	1.59	1.36
February	....	0.95	0.25	0.77	0.59	2.54	1.04	0.99
March	....	3.41	1.51	6.55	1.16	2.32	1.35	7.88
April	....	6.51	6.25	5.66	5.72	7.31	9.50	......
May	....	1.49	3.73	4.52	6.47	3.46	4.55	......
June	....	1.64	4.73	1.13	2.17	2.53	3.01	......
July	....	0.76	2.92	0.44	0.43	1.05	1.24	......
August	....	0.54	2.82	0.46	0.31	0.97	0.98	......
September	....	0.43	0.56	0.33	0.46	0.56	1.29	......
October	....	0.68	0.33	0.54	0.95	0.99	1.39	......
November	0.94	2.16	4.12	0.92	2.06	1.65	1.18	......
December	2.53	0.48	5.69	1.61	1.93	1.58	1.46	......

HUDSON RIVER AT FORT EDWARD, WASHINGTON COUNTY, N. Y.

This station, which is located at the dam of the International Paper Company, was established in 1895, in connection with Upper Hudson storage surveys.[a] The dam is of framed timber on slate rock foundation, and has but little leakage. The crest is straight, very nearly level, and 587.6 feet in length. The crest gauge zero stands at the level of the lip of the dam proper. Flashboards are usually maintained on the dam from 15 inches to 18 inches in height. A record is kept of the height of flashboards, and of the times of their setting and removal.

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[a] See Report of State Engineer and Surveyor of New York, 1895, p. 105.

During 1901, the station has been equipped with new metallic gauges of standard form. The crest gauge is attached vertically to the timber bulkhead above the left-hand end of the dam. The gauges are divided to feet and inches, and readings are taken each morning by Frank Chapman.

There are 62 water wheels in the adjoining mill. These are nearly all of modern types which have been tested at the Holyoke flume. A record is kept of the daily run of each in hours, as well as of the working head, which is usually 19 feet. The discharge through the turbines is taken from diagrams expressing the flow as a function of the working head and number of wheel-hours run.

In the winter of 1896-1897, a flood spillway was cut around the south end of the dam, over which the water begins to flow whenever it reaches the level of the crest of the flashboards. The profile of the spillway is very irregular and causes some uncertainty in the calculated flows during times of high water.

Whenever the flashboards are off from the main dam the flow is computed by means of the formula used by the East Indian engineers in their computations for irrigation works.[a]

With the flashboards on, the flow has been computed from Francis' well-known formula for the sharp-edged weir. During the dry season but little water passes over the dam, the entire flow being employed to drive the turbines. A current meter measurement was made at the highway bridge below the dam on July 26, 1900. The flow was found to be 2,704 second-feet.

The calculated discharge from the gauge readings at the dam and mill varied from 2,420 to 2,720 second-feet while the measurement was being taken. The turbines did not run continu-

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[a] See p. 21.

only for 24 hours at this rate however. The mean flow for the day was 1,467 second-feet.

During the navigation season water is diverted from Hudson River at Glens Falls feeder dam, 7 miles above Fort Edward, for the supply of Champlain Canal.

The drainage area tributary to the Hudson above Fort Edward is 0.56 of that of the same stream above Mechanicville gauging station. The principal intervening tributaries are the Hoosic River and Batten Kill, having drainage areas of 730 and 460 square miles respectively.[a]

High Water of Hudson River at Fort Edward, Washington County, N. Y.

DATE	MAXIMUM DISCHARGE.	
	Second-feet.	Second-feet per square-mile.
April 18, 1896	42,650	15.2
November 7, 1896	24,550	8.7
April 12, 1897	23,732	8.5
June 12, 1897	23,242	8.3
December 17, 1897	27,930	10.0
March 16, 1898	29,856	10.7
April 25, 1898	32,159	11.5
April 23, 1900	43,900	15.7
April 23, 1901	42,820	15.3

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[a] Water Power of Upper Hudson River is described in Report of New York State Engineer and Surveyor, 1895, pp. 124-154.

Mean Daily Flow in Second-feet of Hudson River at Fort Edward, Washington County, N. Y.
[Drainage area, 2,800 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept	Oct.	Nov.	Dec.
1899.												
1	*2,415	2,822	3,744	6,514	23,033	3,106	583	*a* 363	923	*2,181	9,268	1,941
2	2,619	2,822	3,744	*1,600	23,033	3,106	*945	363	923	2,181	11,948	1,941
3	2,619	2,502	3,744	4,878	23,033	3,106	945	363	*20	1,785	12,250	*1,280
4	2,619	2,606	6,151	4,878	19,689	*1,356	945	363	1,186	1,785	9,403	4,267
5	2,619	*945	*2,415	4,878	19,689	2,218	583	363	1,186	1,211	*14,930	4,307
6	2,877	1,839	5,444	4,878	21,949	2,218	289	*	1,184	912	9,402	4,307
7	2,877	1,539	5,444	4,651	*12,340	2,218	743	*b*	920	1,172	5,608	4,243
8	*4,335	1,539	5,444	4,651	21,949	2,218	762	.....	920	*20	7,974	4,243
9	4,320	1,539	5,444	*1,560	21,949	2,218	*100	....	920	1,008	7,951	4,243
10	3,896	1,539	5,444	4,334	8,283	2,138	1,547	.....	*20	1,112	6,149	*1,016
11	3,872	1,162	5,414	9,202	6,549	*1,356	1,547	....	975	1,184	6,149	2,194
12	2,944	*942	*3,025	9,967	7,049	1,917	1,817	......	953	1,182	*1,860	2,369
13	3,225	2,109	5,444	9,967	7,049	1,917	1,817	*	867	1,182	8,923	9,675
14	4,300	2,109	5,444	17,428	*6,960	1,932	1,817	574	631	919	3,817	11,410
15	*2,415	2,109	5,444	17,406	7,049	1,932	1,817	574	620	*20	3,135	11,410
16	5,368	2,109	5,315	*20,095	5,204	1,860	*455	574	577	1,177	3,133	8,180
17	5,368	2,109	4,335	21,222	5,204	1,720	1,817	916	*20	575	3,133	*5,882
18	5,388	1,504	4,335	21,222	5,204	*945	1,817	916	624	576	3,133	8,229
19	5,388	*1,150	*3,844	21,800	5,204	1,683	1,817	916	624	826	*20	8,229
20	5,388	1,682	6,099	27,059	8,617	1,451	1,817	*20	577	861	2,900	8,574
21	5,388	1,682	6,229	29,545	*700	968	1,645	1,176	854	1,184	2,900	8,574
22	*1,356	1,682	6,229	29,618	4,864	754	1,645	1,176	1,024	*20	2,900	8,574
23	3,491	2,012	6,229	*25,040	4,764	590	*465	1,176	1,024	1,416	2,580	8,220
24	3,776	2,308	5,703	32,158	4,184	590	1,368	916	*20	1,439	2,311	*2,415
25	3,618	1,600	5,703	32,153	4,282	*747	1,300	916	1,184	923	2,044	2,415
26	3,623	*1,600	*2,415	29,619	3,901	1,329	1,103	916	3,404	918	*20	4,809
27	3,623	2,853	5,444	29,619	3,901	891	1,103	*574	4,889	919	2,311	4,234
28	3,041	2,842	5,444	29,620	*1,356	888	1,275	1,176	4,889	919	2,206	4,234
29	*925	.....	5,506	27,032	3,104	585	1,275	576	4,181	*20	2,206	4,234
30	2,816	..	5,506	*23,120	3,104	583	*20	576	4,181	1,183	2,206	4,234
31	2,816	.....	5,506	.....	3,101	...	461	948	...	1,183	....	*20
Mean.	3,527	1,902	5,005	16,811	9,561	1,617	1,150	714	1,347	1,033	5,098	5,157
1900.												
1	3,001	3,481	2,879	*3,237	12,486	4,924	*175	1,927	1,044	827	1,620	5,586
2	1,957	3,22	4,242	4,932	11,899	4,924	827	1,401	*958	827	1,266	*5,611
3	1,957	3,221	4,362	5,261	10,776	*3,422	827	1,719	190	827	1,406	7,697
4	1,457	*1,810	*3,019	5,701	11,626	4,9 1	80	1,832	1,445	827	*302	4,421
5	1,957	2,061	4,462	5,701	9,646	5,094	1,216	*1,087	827	827	1,462	4,421
6	2,053	2,447	3,215	7,370	*3,015	4,671	931	1,256	715	827	834	4,183
7	*1,401	2,417	3,859	10,566	7,351	4,419	821	1,087	827	*20	1,226	4,661
8	2,217	2,447	3,741	*11,360	8,246	4,440	*1,215	1,350	827	1,406	1,006	4,181
9	2,217	3,221	3,471	14,316	5,836	4,530	1,228	1,579	*827	1,216	1,119	*7,261
10	2,217	3,389	4,218	11,636	8,246	*1,367	1,255	1,740	1,211	1,216	2,203	2,454
11	2,217	*2,062	*3,259	11,636	6,608	3,859	827	1,729	1,211	1,258	*875	2,061
12	2,217	4,136	3,879	11,636	6,608	3,201	1,260	*1,053	1,211	1,284	2,203	2,806
13	2,217	7,369	3,659	10,776	*4,450	2,924	841	2,271	827	1,866	2,203	2,656
14	*1,571	16,615	3,723	10,776	5,361	2,921	1,467	2,565	1,579	*872	1,883	2,288
15	2,217	17,747	3,759	*9,202	6,378	2,981	*803	3,019	1,293	1,818	1,947	2,138
16	2,217	18,499	3,571	10,776	7,848	2,268	2,171	3,233	*686	1,504	1,691	*965
17	2,217	18,975	3,095	12,946	5,998	*795	1,248	3,347	1,233	1,306	2,947	2,275
18	2,217	*18,045	*1,802	17,076	6,987	2,941	1,220	2,959	1,233	1,450	*1,183	1,826
19	2,317	15,531	3,479	23,626	5,961	1,677	934	*1,42	1,112	1,246	2,040	1,940
20	2,217	9,340	3,479	31,495	*3,015	1,957	1,360	2,242	1,112	1,224	1,901	1,920
21	*1,401	9,141	4,830	34,899	7,842	2,407	1,268	1,220	1,21	*872	4,863	2,138
22	5,858	7,611	4,942	*34,470	5,967	1,915	*30	1,581	1,175	1,611	7,074	*2,138
23	7,312	7,018	4,942	43,900	6,336	1,979	1,306	977	*912	1,040	10,213	1,795
24	7,577	6,259	4,942	36,061	5,111	*20	1,338	940	1,612	1,118	6,482	1,590
25	6,991	*5,609	*2,911	30,915	8,677	2,607	2,083	901	1,661	1,106	*3,260	3,170
26	6,991	4,694	4,742	26,685	4,912	2,191	1,467	*95	1,557	1,251	6,268	2,637
27	5,862	4,232	4,742	23,536	*415	1,178	3,441	928	1,329	1,773	....	3,186
28	*2,041	4,045	4,466	18,480	4,366	2,181	3,263	928	1,435	*804	......	2,887
29	5,212	.....	4,882	*14,250	4,319	1,241	*175	1,487	1,180	2,703	......	2,887
30	4,287	.	4,942	14,210	3,374	1,069	1,987	1,581	*865	2,447	......	*2,637
31	3,571	......	4,942	.....	3,460	...	1,656	1,791	......	1,647	....	2,637
Mean.	3,211	7,074	3,934	16,914	6,858	2,834	1,248	1,652	1,110	1,243	2,670	3,198

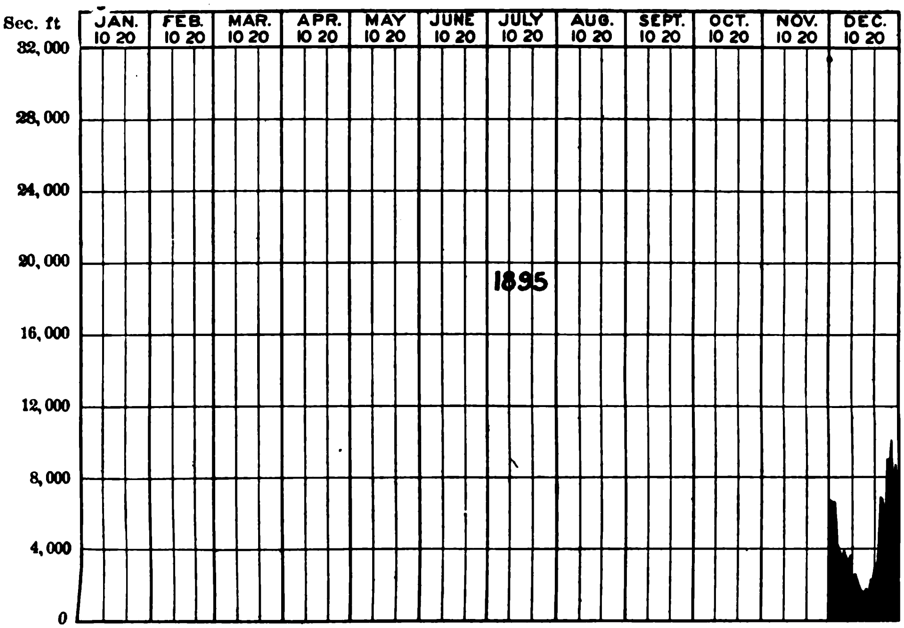
*Sunday. *a* Record probably incomplete. *b* Record not kept.

Mean Daily Flow in Second-feet of the Hudson River at Fort Edward, Washington County, N. Y.—
(Concluded.)

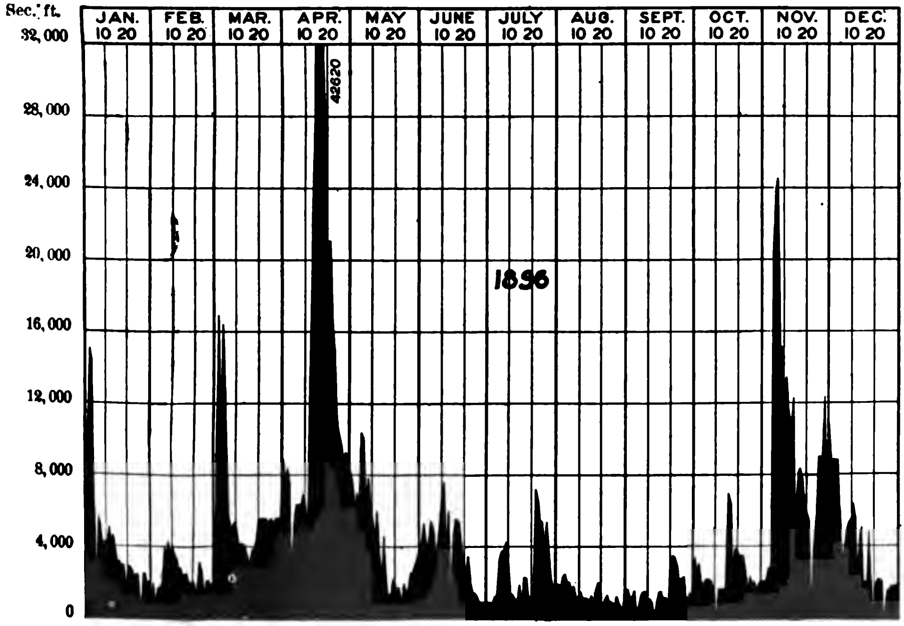
[Drainage area, 2,800 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1....	2,598	1,698	1,683	11,946	13,263	8,259	3,210	4,216	*3,155	2,520	2,504	*1,260
2 ...	2,833	1,738	1,833	10,357	12,666	*5,868	3,090	1,859	3,474	2,301	1,331	2,244
3	1,818	*1,140	*485	10,560	11,183	10,135	1,882	1,502	4,889	1,996	*2,231	2,336
4.	1,638	1,803	1,558	11,633	10,317	8,672	2,231	*1,020	4,238	2,391	2,806	2,336
5....	1,818	1,863	1,018	12,583	*6,995	8,571	2,800	2,190	3,462	1,512	2,769	2,244
6....	*725	1,848	1,336	13,907	9,585	7,641	1,052	2,911	3,036	*1,739	2,909	1,769
7 ...	1,958	1,698	1,183	*19,497	7,019	9,913	*1,680	2,181	1,498	2,771	2,613	898
8..	1,843	1,698	1,193	21,612	7,686	10,266	2,065	3,176	*2,231	2,916	2,504	*2,131
9. ..	1,958	1,698	1,193	20,196	7,783	*9,245	2,290	4,314	2,433	2,771	1,338	1,810
10.....	1,958	*1,055	*880	19,658	7,331	10,887	2,040	2,452	2,136	2,651	*1,950	2,379
11. .	1,958	1,698	1,818	19,122	6,854	8,571	2,030	*3,474	1,876	2,651	2,556	4,279
12....	1,958	1,583	1,558	18,675	*3,490	7,093	1,890	4,454	1,731	1,282	2,126	4,279
13 ...	*1,005	1,688	1,818	18,675	7,148	6,159	953	3,931	1,991	*1,482	2,743	4,026
14. .	2,218	1,583	1,698	*18,175	7,946	5,246	*1,680	2,911	1,184	2,916	3,029	1,845
15. ..	2,218	1,583	1,818	18,932	9,197	5,076	1,473	2,301	*2,834	4,782	2,909	*18,680
16. ..	2,088	1,698	1,698	20,785	8,566	*3,946	1,770	3,176	3,716	4,782	1,378	20,036
17....	2,088	*1,140	*1,000	21,821	6,854	4,091	1,565	1,382	3,716	4,476	*2,231	16,579
18. ...	2,088	1,583	2,148	22,880	6,888	4,093	2,675	*2,231	3,176	4,476	2,676	11,954
19. ..	2,218	1,558	1,912	21,821	*3,627	8,271	8,210	2,651	2,916	1,809	2,124	8,941
20. ..	*1,005	1,583	1,818	22,753	11,611	3,204	1,062	1,851	2,106	*2,231	1,864	6,195
21.....	2,218	1,583	3,023	*20,708	9,197	5,097	*1,680	1,731	1,25	3,868	1,864	2,443
22.....	2,218	1,698	3,768	31,890	8,881	5,726	2,865	1,851	*791	3,556	1,864	*2,834
23. ...	1,863	1,698	4,578	42,820	8,253	*4,274	2,675	2,131	2,063	3,146	909	3,518
24. ..	2,078	*880	*1,120	40,790	7,946	5,986	1,770	1,382	1,931	2,916	*1,680	3,494
25....	2,078	1,583	4,578	37,036	12,946	5,301	1,770	*1,040	1,216	2,771	2,476	1,736
26.....	2,013	1,598	8,933	31,151	*7,662	4,791	1,770	3,602	1,616	1,335	2,384	4,116
27.... .	*1,140	1,743	12,270	23,291	6,148	4,791	332	3,446	2,386	*1,690	1,864	3,804
28. ..	2,048	1,583	13,126	*18,704	6,851	4,648	*2,231	3,076	1,259	2,683	1,724	1,538
29.....	1,418	. ...	12,270	17,019	8,565	3,944	3,120	2,651	*3,474	2,251	1,724	*2,790
30.....	1,508	. ...	12,270	16,056	9,197	*3,456	4,072	2,131	1,933	2,251	1,018	2,739
31.....	1,493	.....	*1,015	...	9,197	.. ...	4,797	1,262	......	1,876	. ...	3,356
Mean .	1,827	1,547	3,415	21,154	8,895	6,256	2,190	2,531	2,463	2,679	2,188	4,807
1902.												
1.	2,751	1,366	2,491	14,807	7,600	*4,865	5,192	5,298	2,231	4,763	8 894	3.868
2....	2,166	*2,237	*8,140	12,870	10,259	6,738	5,192	5,197	2,715	5,031	10,460	3,175
3. ..	2,478	2,963	17,818	9,155	4,817	4,626	14,597	*7,255	2,449	4,624	9,817	3,491
4....	1,128	2,193	20,450	8,479	*7,255	4,626	15,310	8,254	2,277	2,085	7.235	4.357
5.....	*2,231	2,193	19,985	4,498	9,661	5,192	15,244	6,081	2,105	*2,590	6.315	4,430
6.. ..	2,647	2,219	15,019	*4,135	7,176	5,192	*10,460	5,131	1,104	4,058	5,611	1,898
7.....	2,247	2,593	15,241	5,213	8,829	2,776	10,149	7,288	*3,155	4,219	5,396	2,834
8. ...	2,647	1,248	13,110	4,902	6,851	*4,135	7,926	7,286	3,823	4,312	2,804	3,619
9.	2,942	*2,231	*18,670	4,612	6,022	6,684	6,081	5,256	3,200	4,312	4,865	3,488
10	2,674	,447	8,169	10,335	2,776	4,626	5,821	*7,255	2,924	4,058	5 085	3,211
11. ...	1,144	2,447	7,821	5,170	*4,135	4,626	5,821	8,273	3,481	1,546	3,900	3.634
12.....	*2,231	2,198	8,000	11,987	4,829	5,193	2,916	5,902	2,203	*1,155	3,740	3,718
13 ...	2,767	2,193	7,976	* 2,030	4,568	1,578	*4,135	6,042	1,896	3,226	4,035	1,558
14. ..	2,507	2,193	15,178	10,487	4,569	4,135	4,594	5,461	*2,834	2,835	4.310	3,474
15	2,247	1,155	15,754	7,625	4,254	*6,235	2,949	5,036	3,504	3,135	2.801	2,329
16....	2,647	*1,950	*15,310	7,086	4,281	6,645	4,743	2,906	2,452	3,628	6,035	2,827
17.. ..	2,507	2,162	29,707	6,240	1,958	4,886	5,192	*4,135	2,107	4,058	7,287	4.401
18....	1,144	2,334	25,031	5,554	*115	5,031	4,886	3,968	1,723	1,899	5,396	6 632
19. ...	*1,950	2,221	21,577	2,822	8 804	5,192	2,380	8,876	1,983	*4,135	5.031	5,590
20.	2,108	2,478	18,306	*4,135	5,821	6,682	*5,615	3,791	897	6,684	5 192	3,217
21.....	1,966	2,479	12,977	6,931	4,025	5,198	7,550	3,791	*1,680	5,611	5,396	5,654
22.	1,765	1,273	10,483	5,135	8,483	*6,235	7,235	3,791	1,699	5,316	3,277	8,263
23. ..	2,369	*1,950	*13,13	4,028	8,482	8,742	9,368	1,718	1,547	4,886	4,135	10,037
24.....	3,145	2,479	10,421	4,028	4,728	5,999	9,712	*2,231	1,459	4,368	4.364	10.039
25.. .	1,740	2,339	10,539	3,769	*30	4,886	9,206	4,676	1,579	4,150	4,364	7.680
26.....	*3,155	2,447	8,431	1,992	4,421	4,686	6,147	3,506	2,047	*4,135	4.310	9,550
27.....	3,785	2,858	9,155	*5,615	4,420	5,192	*6,835	3,248	872	4,421	4,810	6,126
28.....	3,360	3,262	7,823	6,570	4,421	2,850	7,658	2,968	*3,474	4,369	4,310	6.635
29. ..	2,969	......	5,386	6,575	8,822	*7,255	7,556	3,802	4,857	10,588	1,982	6 832
30. ..	2,711	......	*11,500	5,439	4,440	8,639	6,931	1,294	4,712	14,071	5,645	5.590
31.....	2,969	.....	14,127	.. ....	2,005	. ...	5,830	*2,231	. ...	15,014	. .	5.348
Mean.	2,422.4	2,218.0	3316.2	7,060.0	4,691 8	5,292.9	7,204.	44,742.	62,466.	14,841.	5,194	1,961

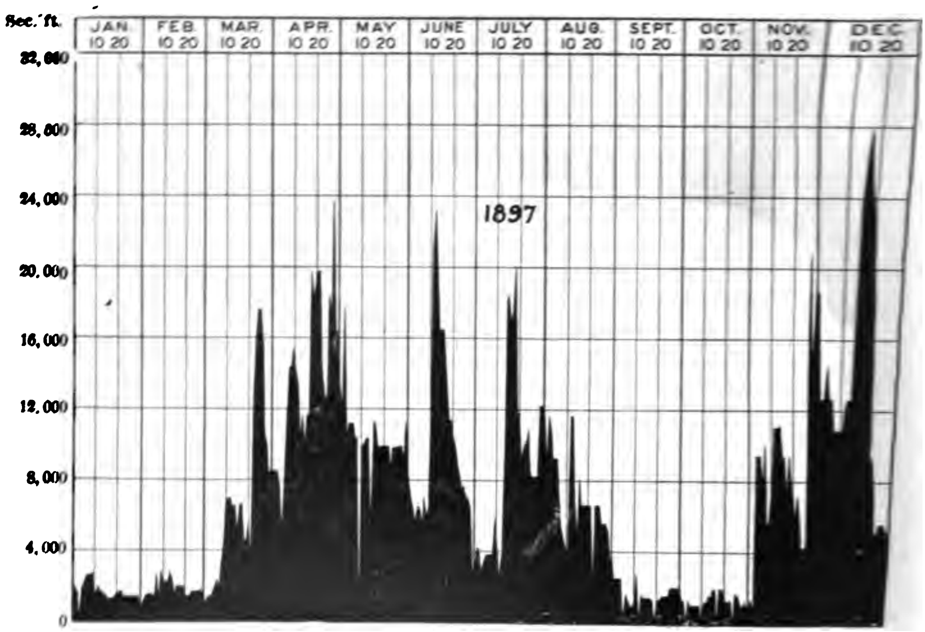
*Sunday.



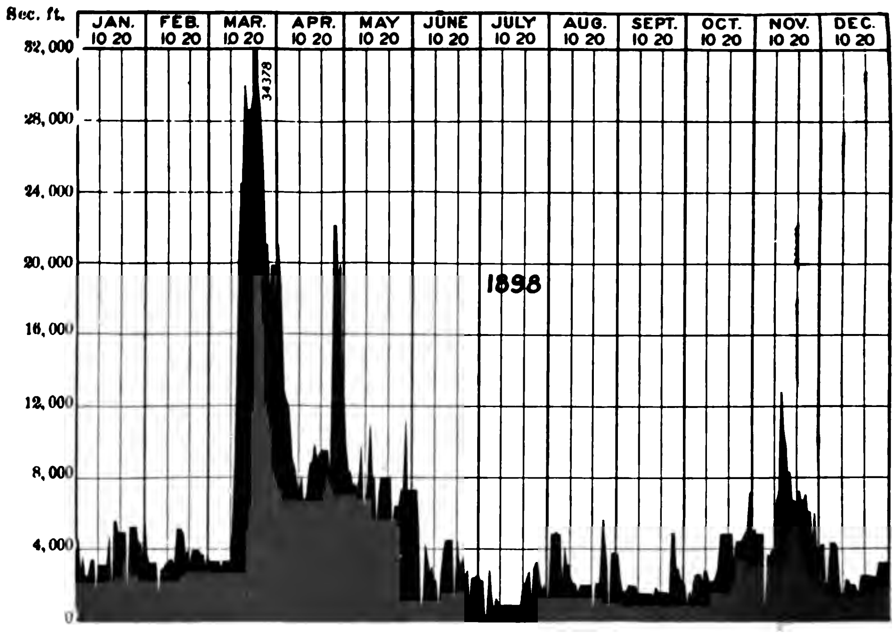
Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1895.



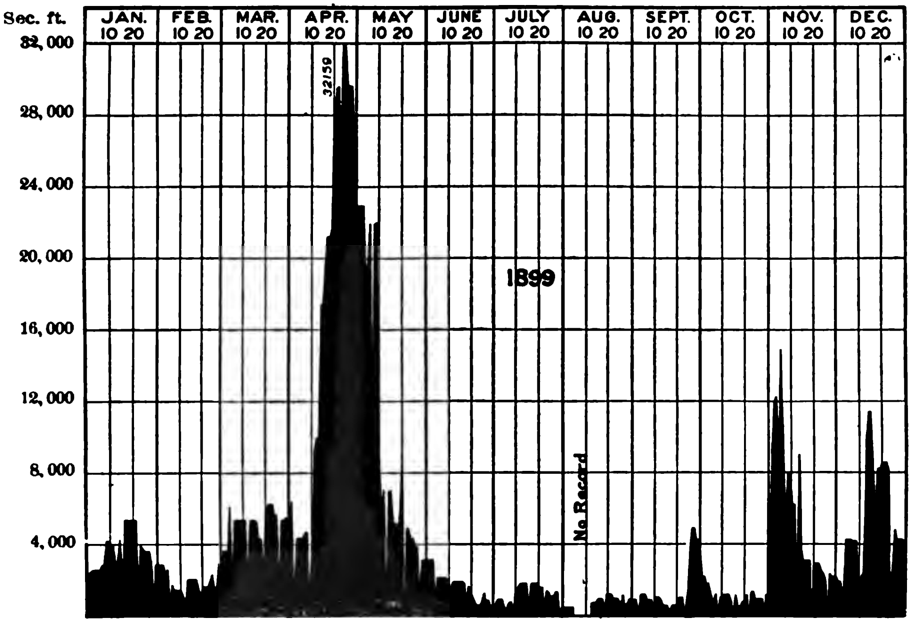
Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1896.



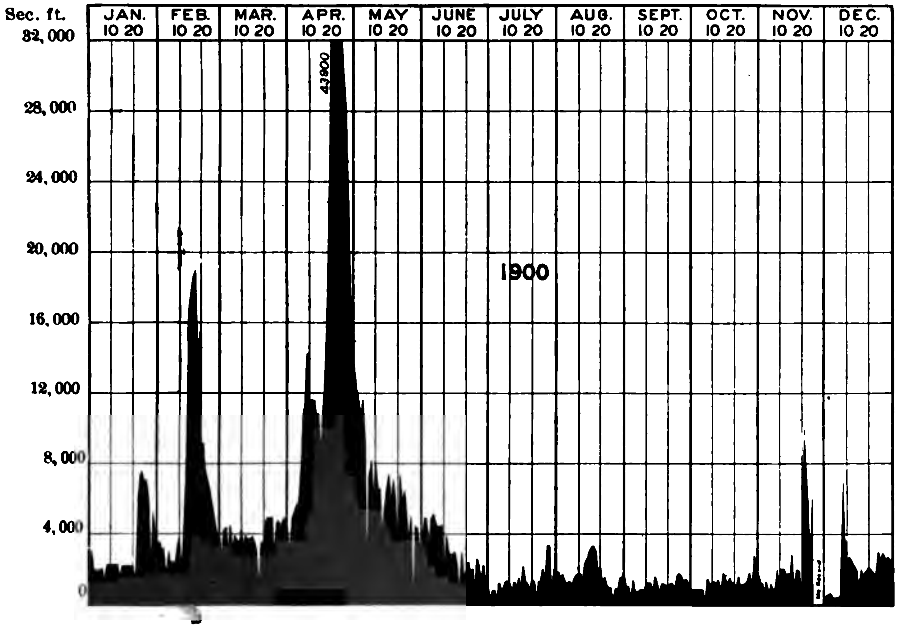
Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1897.



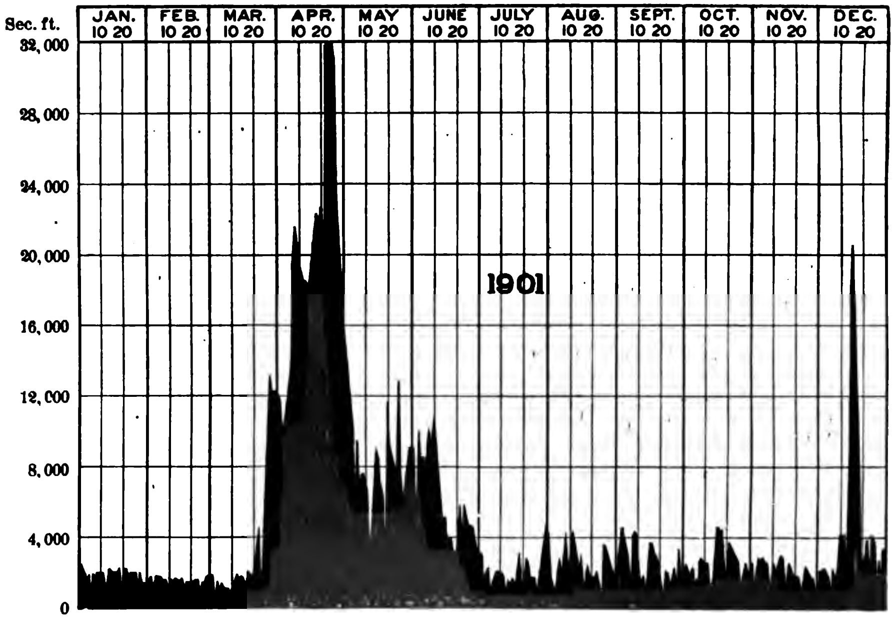
Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1898.



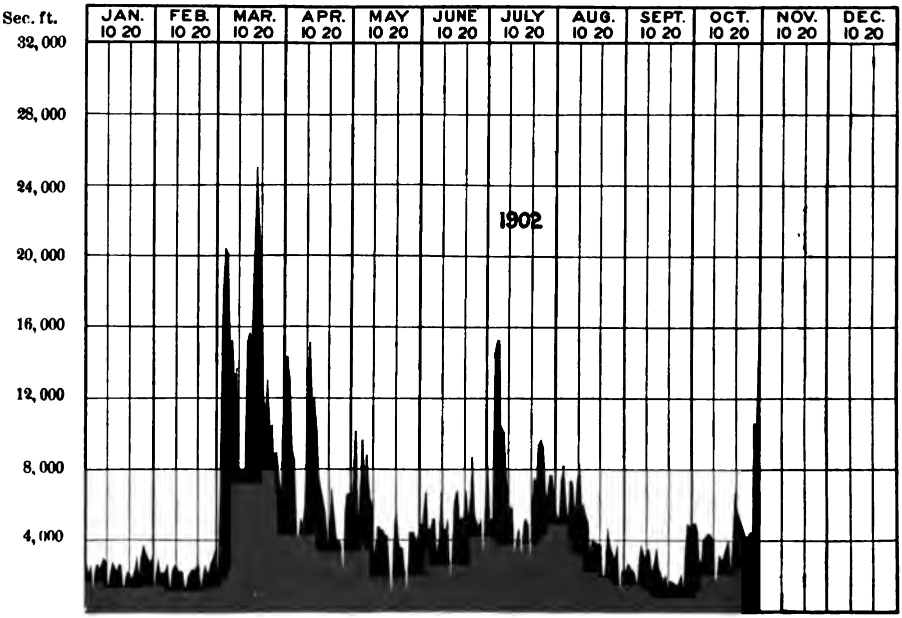
Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1899.



Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1900.



Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1901.



Discharge of Hudson River at Fort Edward, Washington County, N. Y., 1902.

Mean Monthly Run-off of Hudson River at Fort Edward, Washington County, N. Y.

[Drainage area, 2,800 square miles.]

Second-feet.

MONTH.	1899.	1900.	1901.	1902.
January	3,527	3,211	1,827	2,422
February	1,902	7,074	1,547	2,218
March	5,005	3,934	3,445	13,316
April	16,811	16,914	21,154	7,060
May	9,561	6,358	8,395	4,692
June	1,617	2,834	6,256	5,293
July	1,150	1,248	2,190	7,204
August	714	1,652	2,531	4,743
September	1,347	1,110	2,463	2.466
October	1,033	1,243	2,679	4,841
November	5,098	5,077	2,138	5,191
December	5,157	5,331	4,807	4,961

Second-feet per Square mile.

MONTH.	1899.	1900.	1901.	1902.
January	1.26	1.15	.65	.86
February	.68	2.55	.55	.79
March	1.79	1.40	1.23	4.75
April	6.00	6.04	7.55	2.52
May	3.41	2.27	3.00	1.67
June	.58	1.01	2.23	1.53
July	.41	.45	.78	2.57
August	.26	.59	.90	1.69
September	.48	.40	.88	.88
October	.37	.44	.96	1.73
November	1.82	1.13	.76	1.87
December	1.84	1.18	1.06	1.76

Inches on Drainage Area.

MONTH.	1899.	1900.	1901.	1902.
January	1.95	1.32	.75	.99
February	.70	2.64	.57	.82
March	2.05	1.61	1.41	5.47
April	6.69	6.74	8.46	2.81
May	3.83	2.61	3.45	1.93
June	.63	1.13	2.50	1.71
July	.47	.51	.90	2.96
August	.30	.68	1.03	1.95
September	.53	.44	.99	.98
October	.42	.50	1.10	1.98
November	2.03	1.26	.85	2.09
December	2.12	1.36	1.22	2.03

HUDSON RIVER AT MECHANICVILLE, SARATOGA COUNTY, N. Y.

A record of the flow of Hudson River at Mechanicville has been kept by the Duncan Company, beginning December, 1888. The record includes two daily readings of the depth on the crest of the dam, and a continuous record of the run of the water wheels in the adjoining paper mill. The accompanying tables show the monthly and daily mean flow at Mechanicville, computed by Mr. R. P. Bloss, the engineer of the company. A record is kept of the length and height of the flashboards at all times, with the dates of their setting and removal.

The flow over the dam has been computed by the Francis formula for the Merrimac dam:

$$Q=3.012\,L\,H^{1.53}$$

L being 794 feet. H=depth on crest of dam in feet. The same formula has been used in all cases, whether flashboards are on or off.

The flow through the water wheels has been taken from the rating tables of the manufacturers. The working head on the wheels varies from 15 to 17 feet, depending on the condition of the flashboards on the dam. A test, by Mr. Bloss, of a 39-inch Hercules wheel in the mill, which has been in use about eight years, shows the actual discharge to be substantially as given in the manufacturers tables when running at the speed of greatest efficiency. When running at higher speed the discharge may be several per cent. less.

A current meter measurement of the flow below the dam was made at the Mechanicville toll bridge October 20, 1900, showing a discharge of 1,871 second-feet. The result is somewhat uncertain, owing to slack water. No water was flowing over the dam, and the calculated turbine discharge was 1,977 second-feet.

The flow of Hudson River at Mechanicville prior to 1899 has been calculated using the East Indian engineers' formula for flow over the dam.[a] This formula gives a somewhat larger discharge than that obtained by using Bazin's formula. (See p. 21.)

The highest flood since the record has been kept occurred April 19, 1896, and showed a discharge of 59,400 second-feet or 13.2 second-feet per square mile.

The highest known freshet discharge of Hudson River occurred in the spring of 1869. The calculated discharge at Mechanicville was 70,000 second-feet or 15.5 second-feet per square mile.[b]

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[a] See Report of State Engineer and Surveyor of New York, 1895, pp. 104-107.

[b] A list of Hudson River high-water marks is given by G. L. Harrison, in Report of U. S. Board of Engineers on Deep Waterways, 1900, Pt. 1, pp. 377-378

Mean Daily Flow in Second-feet of Hudson River at Mechanicville, Saratoga County, N. Y.
[Drainage area, 4,500 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1898.												
1	6,252	4,340	5,011	20,306	13,474	9,490	3,179	3,005	†4,345	3,222	7,954	6,300
2	*	4,839	4,908	18,016	11,515	8,159	3,014	3,888	†4,007	*2,877	7,667	6,130
3	5,819	5,034	4,927	*15,810	9,702	7,558	3,007	6,225	†4,145	2,835	6,590	5,698
4	5,276	4,114	4,909	13,890	10,840	6,292	*3,007	5,722	*†4,310	2,780	6,500	*5,185
5	5,563	3,956	4,791	11,932	10,570	*5,808	3,364	6,031	4,547	11,210	5,890	5,994
6	5,618	*	*	10,692	11,300	5,508	2,588	5,832	4,145	20,089	*5,803	6,500
7	6,873	4,000	4,998	9,928	11,032	4,729	2,453	*5,415	4,007	9,472	5,890	6,322
8	7,592	5,286	4,875	8,787	*10,250	4,899	2,314	5,091	4,930	8,261	5,503	5,456
9	*	5,139	6,418	8,158	9,700	4,249	2,220	4,335	4,217	*7,872	5,872	4,150
10	6,431	5,145	7,004	*7,924	8,695	5,978	*1,163	3,926	3,813	6,960	6,238	4,675
11	6,249	5,865	9,746	7,915	7,875	3,425	2,000	3,743	*3,368	6,038	20,256	*4,345
12	5,136	7,639	20,202	7,646	8,410	*3,857	2,182	3,887	3,804	6,100	16,262	4,290
13	11,930	*	*	8,553	11,054	4,299	2,058	3,331	3,188	5,331	*14,510	3,789
14	11,424	9,732	39,231	9,815	10,585	4,945	2,080	*3,148	2,732	4,829	13,202	3,540
15	10,557	8,078	36,155	9,824	*10,161	7,662	2,184	3,362	2,597	6,888	11,385	3,850
16	*	7,706	31,310	12,188	9,967	6,872	2,159	3,250	2,487	*7,838	10,366	4,007
17	10,176	5,396	31,069	*12,575	10,082	5,681	*1,163	3,223	2,597	8,125	9,722	4,495
18	7,898	6,978	31,794	12,188	10,637	4,620	2,192	3,235	*2,873	7,250	8,910	*4,590
19	7,318	7,224	29,804	11,155	9,404	*4,85	2,224	3,660	2,878	6,500	8,922	4,590
20	8,401	*	*	11,157	9,412	5,593	2,175	4,507	3,865	6,508	*10,505	4,885
21	14,053	7,445	35,917	10,922	8,355	4,603	2,192	*4,495	2,975	6,418	11,167	5,085
22	10,625	7,848	33,660	10,127	*7,054	4,899	3,188	4,718	2,899	6,810	10,866	5,085
23	*	6,746	30,004	9,815	8,000	4,198	3,565	3,927	2,666	*6,894	9,610	6,908
24	11,873	6,149	26,754	*9,627	8,400	4,318	*3,519	5,779	3,297	7,578	8,898	8,869
25	9,866	5,915	24,034	20,440	9,491	4,007	3,928	†11,167	*5,231	7,178	8,685	*7,747
26	9,173	5,461	21,040	24,210	11,953	*4,024	4,665	†9,953	6,878	6,693	7,817	6,885
27	8,171	*	*	24,848	14,758	4,115	4,258	†8,125	5,706	9,382	*6,418	5,872
28	8,101	5,880	19,077	20,440	15,327	3,556	3,656	*†8,250	4,775	11,042	5,820	4,618
29	7,727	....	19,818	18,105	*14,140	3,508	3,352	†6,104	4,845	10,485	6,300	4,628
30	*	....	22,777	14,873	12,727	3,238	3,175	†4,829	3,650	*10,059	6,300	4,828
31	4,822	....	21,805	.....	10,490	....	*3,015	†4,217	.....	9,953	.....	5,348
Mean.	8,173	6,038	19,617	13,047	10,525	5,069	2,751	5,029	3,810	7,516	8,978	5,291
1899.												
1	*4,262	3,910	7,847	7,980	26,900	3,990	2,220	1,520	1,713	* ...	4,564	3,005
2	4,262	4,268	7,040	*7,159	27,617	3,796	*1,047	629	1,561	4,042	8,889	3,414
3	5,209	4,268	6,408	6,955	25,551	3,601	2,128	1,218	*	3,453	12,020	*3,753
4	6,065	4,150	....	7,934	22,472	*2,220	....	1,153	1,293	2,851	11,899	5,545
5	9,146	*4,012	*	9,405	19,242	2,990	2,741	1,085	1,860	2,745	*10,346	6,678
6	8,460	4,223	16,501	9,955	15,152	2,840	1,610	*	1,764	2,650	11,019	5,974
7	8,355	4,048	12,266	11,719	*13,662	2,7.8	1,670	1,494	1,706	2,571	9,308	5,210
8	*8,350	4,275	9,077	19,708	10,960	2,805	1,211	1,616	1,680	*	8,140	4,558
9	8,026	3,448	8,665	*16,275	9,270	2,525	* .	1,475	1,466	2,590	7,166	3,806
10	6,562	3,665	7,909	15,062	8,587	2,290	3,000	484	*	2,712	6,662	*3,265
11	5,766	3,622	7,315	15,582	7,446	* ..	3,533	1,148	1,480	2,903	6,182	3,509
12	5,250	*4,062	*11,739	16,875	7,550	2,399	3,296	998	1,598	2,874	*5,490	4,979
13	5,272	4,196	15,437	17,145	7,155	2,505	3,248	* ..	1,471	2,926	6,321	11,183
14	5,960	4,504	12,158	21,378	*7,060	2,230	3,002	1,580	1,567	2,853	5,536	14,576
15	*7,435	4,600	10,555	27,975	7,772	2,185	2,800	1,680	1,444	*	5,179	14,979
16	8,910	4,793	10,012	*29,730	7,846	3,078	*	1,501	1,549	2,177	4,858	13,452
17	10,155	5,596	9,080	31,112	5,738	3,060	2,861	1,815	*	2,182	5,283	*9,646
18	9,685	5,691	7,806	29,667	5,729	*2,762	3,338	979	711	1,853	4,857	9,534
19	7,339	*5,620	*9,322	29,711	5,928	2,950	2,860	1,390	1,636	1,798	*4,859	9,968
20	6,385	5,267	11,850	33,910	5,917	2,508	2,560	* ..	937	1,987	4,838	10,950
21	6,297	4,855	9,670	36,210	*5,925	2,372	2,485	1,610	941	2,185	4,729	11,048
22	*5,770	5,686	9,337	36,210	6,187	2,260	2,295	1,123	1,448	* .. .	4,587	10,721
23	5,697	10,083	8,645	*37,146	5,313	2,105	* ...	1,743	1,464	2,466	4,297	9,642
24	5,522	7,501	8,657	38,283	4,756	1,878	2,240	2,460	*	2,698	3,964	*8,068
25	6,950	5,583	8,095	39,064	4,710	*304	2,233	1,343	1,516	2,372	3,731	8,241
26	5,775	*5,255	*7,492	41,475	4,462	1,878	2,188	1,468	2,116	2,304	*3,472	7,821
27	5,438	6,450	6,895	40,664	4,117	2,241	2,021	* .	6,000	2,126	4,027	5,832
28	4,545	10,326	6,615	38,300	*3,985	2,290	2,140	1,756	5,127	2,216	3,495	5,435
29	*4,291	......	7,885	33,908	4,125	2,368	1,686	1,738	4,413	*	3,439	4,889
30	4,345	......	8,765	*30,292	3,787	2,512	* .	1,739	4,870	3,194	3,312	4,075
31	4,066	......	7,602	......	3,918	.....	2,055	1,477	.....	3,815	.....	*2,585
Mean.	6,437	5,141	9,316	24,607	9,591	2,539	2,402	1,417	2,054	2,616	6,066	7,303

*Sundays. †Discharge August 25 to September 4 approximate owing to irregular flashboards.

Mean Daily Flow in Second-feet of Hudson River at Mechanicville, Saratoga County, N. Y. — (Continued.)

[Drainage area, 4,500 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
1900.												
1..	3,612	4,163	5,623	*......	16,713	4,288	*2,364	2,977	2,365	2,102	2,531	9,107
2....	3,276	3,349	12,924	10,088	15,493	4,932	2,368	2,809	*2,207	2,223	2,094	*8,316
3. ...	3,294	3,737	10,299	10,413	14,676	*3,482	2,368	2,464	2,177	2,144	2,413	7,444
4....	3,263	*.....	*3,800	11,188	14,593	7,614	2,191	2,386	2,519	2,071	*2,159	6,459
5.....	3,277	6,556	7,998	11,188	12,494	6,793	2,701	*2,167	2,249	1,752	1,977	10,694
6. ...	3,602	8,140	5,932	12,267	*9,444	6,083	2,882	2,135	2,125	1,768	1,925	9,033
7. .	*3,000	7,204	9,312	15,149	9,741	5,551	2,109	2,206	2,031	*2,091	1,576	7,930
8.....	3,816	6,777	6,900	*17,520	10,924	5,329	*2,200	2,607	1,725	1,895	1,666	7,624
9.....	3,556	19,351	6,738	18,804	9,066	5,309	2,130	2,785	*1,248	1,868	2,028	*6,880
10.....	3,998	11,873	7,420	16,643	9,403	*4,430	2,007	2,752	713	1,965	2,510	6,181
11....	3,698	*9,066	*6,342	14,742	10,716	5,827	1,437	2,182	1,738	1,692	*3,860	5,019
12. .	3,218	7,799	6,305	14,237	8,530	4,759	1,692	*2,550	1,916	2,063	4,331	4,663
13. ..	3,159	24,539	5,563	14,362	*7,500	4,175	1,842	2,541	1,801	1,917	3,820	4,988
14.....	*.....	41,285	5,761	13,554	7,626	3,911	2,002	2,691	1,118	*1,931	3,805	4,856
15. ..	3,067	25,351	5,363	*11,988	7,750	4,033	*2,263	3,292	1,433	2,123	3,315	4,250
16....	3,158	22,593	4,411	13,588	9,39·	4,054	2,292	4,299	*1,820	2,061	3,136	*4,250
17....	3,180	19,527	4,719	15,918	7,549	*3,700	2,185	5,773	2,063	2,233	2,911	4,195
18.....	3,139	*16,547	*3,675	22,761	8,241	4,269	2,189	4,617	1,904	2,013	*3,036	4,265
19. ...	4,668	14,173	4,935	33,150	7,500	3,617	1,991	*4,014	2,087	1,978	3,257	3,909
20.....	16,115	12,825	15,344	40,131	*9,450	2,941	1,580	3,955	2,032	1,954	3,829	4,129
21. .	*18,307	11,555	11,058	42,908	10,953	2,774	1,565	3,154	1,412	*1,977	5,292	3,953
22.....	11,307	10,060	7,909	*42,301	9,141	2,968	*2,180	2,834	1,581	2,017	9,312	4,004
23.....	10,176	13,410	8,324	43,546	8,029	3,141	2,299	2,510	*1,704	1,955	10,120	*4,210
24....	9,853	10,188	9,390	41,940	7,351	*1,877	2,271	2,351	1,822	2,253	9,321	5,239
25.....	9,295	*9,301	*10,686	38,575	6,345	2,868	2,092	1,831	1,978	2,195	*8,796	3,763
26... .	8,419	7,042	8,226	33,983	5,758	3,210	2,600	*1,708	1,953	2,167	9,483	6,536
27....	6,913	5,390	7,541	28,578	*4,651	3,713	4,082	1,702	2,002	2,203	11,027	4,700
28.....	*.......	5,252	7,626	25,618	6,454	2,787	3,898	1,811	2,422	*2,330	11,694	4,679
29. ...	6,115	....	7,626	*25,741	5,333	2,361	*2,836	2,192	2,145	2,555	11,347	4,459
30.....	5,808	.....	8,014	19,510	4,042	2,520	3,951	2,142	*2,135	3,287	9,070	*4,593
31.	4,453	......	9,075	.....	3,857	....	3,248	2,278	. ..	3,124	.... .	4,535
Mean.	5,84	12,481	7,740	32,614	8,992	4,093	2,352	2,703	1,880	2,128	5,077	5,331
1901.												
1. .	a4,091	a2,645	2,281	15,444	19,734	*12,179	a3,998	5,689	*2,990	3,858	3,315	*1,800
2...	a3,785	a2,525	a2,190	14,154	17,770	10,329	a3,773	4,802	4,734	3,881	3,826	2,453
3.....	a3,405	*a6,067	*a1,550	14,395	15,456	11,711	a3,591	4,183	6,230	3,834	*2,430	3,631
4....	2,880	a2,938	a1,911	17,770	*14,533	11,491	a2,491	*2,319	6,131	3,269	4,173	3,912
5. ..	2,834	a3,172	a2,742	18,533	14,000	11,371	a1,579	3,733	5,560	3,247	3,770	4,183
6....	*a2,040	a2,969	a2,530	*19,768	11,491	10,379	*a3,832	3,186	5,147	*2,490	3,875	4,115
7. ..	2,834	a3,508	a2,336	32,281	9,567	10,019	a2,771	3,428	4,433	3,673	3,887	3,785
8. ...	2,903	a2,615	a2,332	37,510	9,254	*13,725	a3,072	5,190	*2,840	3,706	3,665	*4,485
9. ..	2,870	a2,538	2,315	34,262	9,120	12,563	a4,154	5,591	4,094	3,640	3,619	5,732
10....	2,927	*	*2,517	31,464	8,195	13,108	a3,719	5,914	3,661	3,527	*2,037	5,252
11. ..	a2,966	a3,072	5,971	27,706	*8,296	11,374	a3,419	*4,675	3,201	3,527	3,783	a8,064
12....	2,927	a3,081	10,688	24,819	8,600	9,693	a3,938	6,011	3,218	3,404	3,612	a6,657
13.....	*a2,040	a2,576	5,052	*23,572	9,558	8,306	*a3,801	5,554	3,340	*1,907	5,497	a .839
14.....	a3,082	a2,714	4,910	22,290	10,279	7,333	..	4,856	4,082	4,690	5,442	a6,589
15. ..	a3,103	a2,676	5,062	24,016	10,716	*6,135	a3,333	4,065	*3,150	6,658	4,970	*25,600
16. ...	a2,988	a2,804	4,183	23,031	10,601	4,230	a3,89	4,190	4,302	7,870	5,024	31,889
17. ..	a1,596	*a4,279	*2,045	24,846	8,310	5,509	a3,858	4,915	5,221	7,382	*2,750	22,507
18.....	a3,966	a2,909	3,535	26,122	*9,466	4,692	a2,367	* ..	5,867	6,487	4,561	17,061
19.....	a3,738	a2,737	6,425	26,494	10,700	4,133	3,383	4,710	3,750	....	4,150	12,995
20. . .	*a2,833	a2,490	5,417	*25,960	15,456	3,880	*4,072	3,733	4,665	*4,070	3,882	10,109
21.....	2,796	a2,647	16,520	24,640	14,029	4,116	2,877	5,682	4,071	5,540	3,585	8,272
22. ...	2,802	a2,189	17,612	41,069	11,819	*5,985	4,112	3,181	*2,450	4,643	3,495	*8,060
23....	2,868	a1,961	11,386	49,611	11,711	5,100	3,663	5,414	3,834	4,856	3,506	7,371
24.....	2,858	*a3,752	*8,988	54,862	11,379	7,140	3,472	4,855	3,576	4,537	*1,400	6,038
25.	2,846	a2,143	11,251	50,650	*10,913	7,040	2,891	*4,600	3,342	4,127	3,947	4,956
26....	2,846	a2,325	15,495	42,976	9,410	5,878	2,453	6,690	2,858	3,933	3,831	6,464
27....	*	2,096	21,681	*33,207	9,565	5,380	*2,246	5,540	2,711	* .. .	3,949	5,154
28.....	a3,642	a2,465	20,612	23,520	11,946	4,955	1,377	4,859	3,657	4,314	3,722	5,026
29....	a3,578	. ...	17,659	21,996	13,084	*4,185	2,909	4,341	*2,450	3,773	3,020	*4,694
30 ..	a2,804	. .. .	16,243	21,246	13,221	2,240	4,997	4,258	4,509	3,518	3,315	12,405
31....	2,673	....	* 5,186	....	13,096	. . ..	5,347	3,675	. ...	3,412	......	8,909
Mean.	3,087	2,888	8,095	28,268	11,658	7,806	3,551	4,661	4,024	4,264	3,732	8,491

a Record approximate, flashboards irregular. *Sunday.

Mean Daily Flow in Second-feet of Hudson River at Mechanicville, N. Y.—
(Concluded.)
[Drainage area, 4,500 square miles.]

DAY.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.	*a*											
1	......	5,019	37,064	28,287	18,099	*6,444	6,524	6,812	2,621	6,823	b14,276	b6,180
2	......	*5,050	*27,340	24,412	18,886	7,611	6,524	8,193	4,245	6,233	b11,253	b4,928
3	......	5,697	41,362	20,724	15,881	6,174	6,976	*7,986	b3,201	6,547	b12,350	b4,849
4	......	4,160	32,881	17,576	*14,365	6,883	10,275	9,530	b2,972	5,504	b10,094	b4,995
5	......	3,754	29,491	14,989	16,173	6,635	11,487	8,555	b3,071	*4,431	b8,822	b6,241
6	......	3,625	21,893	*	14,315	6,810	*12,225	6,933	b3,178	6,319	b8,014	b5,775
7	......	3,658	21,145	12,778	14,820	6,361	11,698	8,393	*b1,789	5,029	b7,592	b3,331
8	......	3,358	19,256	10,843	11,988	*5,050	9,523	9,168	b5,021	5,637	b7,362	b5,524
9	......	*3,925	*15,848	11,848	11,192	7,398	8,335	9,289	b4,216	5,795	b6,087	b5,007
10	......	4,313	16,575	22,112	10,843	5,985	8,148	*8,174	b4,181	5,477	b7,828	b4,186
11	......	3,509	14,541	26,913	*9,360	6,436	7,748	9,593	b4,441	5,020	b5,688	b5,411
12	......	3,889	17,686	25,250	8,923	6,086	6,607	8,955	b4,718	*3,471	b[illegible],279	b5,548
13	......	4,034	23,312	*24,323	7,645	5,836	*4,775	8,630	b4,718	6,033	b5,2[illegible]9	b5,105
14	......	3,964	26,187	21,012	7,848	5,437	6,111	7,678	*b3,735	4,557	b5,442	b6,725
15	......	3,818	25,211	16,448	7,070	*4,109	4,940	8,140	b5,613	4,502	b6,644	b6,896
16	......	*3,944	*	13,603	6,210	6,529	5,755	6,118	b2,944	4,812	b6,726	b5,507
17	......	5,353	33,274	13,060	6,463	7,173	6,242	*4,569	b3,348	4,871	b8,536	b15,846
18	......	4,103	42,910	11,755	*5,756	6,798	6,567	5,842	b3,025	4,855	b7,085	b13,714
19	......	4,778	37,036	10,743	4,102	6,798	5,407	4,837	b2,737	*3,831	b6,720	b11,964
20	......	5,038	30,551	*8,895	5,662	6,086	*5,375	4,489	b2,712	7,669	b6,273	b10,219
21	......	5,126	26,048	11,539	6,012	5,812	14,311	4,477	*1,707	7,574	b6,961	b8,858
22	......	5,308	24,000	10,071	6,632	*5,250	13,391	4,677	4,114	7,174	b6,181	21,649
23	......	*5,788	*21,698	9,348	4,965	6,848	12,331	4,552	3,134	6,635	b4,504	21,787
24	......	6,212	22,387	9,950	4,620	6,886	11,231	*3,350	2,940	5,971	b6,724	16,410
25	......	4,337	19,648	8,446	*4,100	6,140	12,346	5,419	2,835	5,457	b5,639	12,697
26	......	4,488	18,311	8,336	7,748	5,600	11,376	4,270	2,597	*3,907	b5,206	13,808
27	......	7,353	16,723	*9,110	8,760	6,074	*9,315	4,109	2,793	6,442	b5,239	12,514
28	......	9,160	16,035	13,298	13,894	6,988	11,501	3,722	*2,818	10,658	b5,775	10,172
29	......	......	19,815	12,098	9,398	*5,876	10,049	3,586	6,125	b17,901	b5,410	10,939
30	......	......	*26,220	13,672	9,973	7,461	8,948	3,294	6,741	b17,631	b3,840	8,881
31	......	......	29,487	......	10,521	......	7,936	*1,539	......	b16,951	......	8,393
Mean	......	4,741	25,130	15,222	9,749	6,315	8,934	6,286	3,643	6,894	......	......

a Record not available. *Sunday.
b Flashboards irregular; record approximate.

Run-off of Hudson River at Mechanicville, Saratoga County, N. Y., Calculated by means of the East Indian Engineers' Formula. (*a*)
[Drainage area, 4,500 square miles.]
MEAN MONTHLY FLOW IN SECOND-FEET.

MONTH.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
January	6,367	10,983	11,270	8,284	18,857	3,192	6,757	3,876	6,787	4,007	7,723	6,668
February	3,714	3,790	7,913	11,664	9,263	4,805	4,836	3,543	4,668	3,895	6,754	5,258
March	6,845	8,280	11,129	17,736	10,929	8,250	14,738	4,204	13,600	12,214	20,220	9,618
April	21,200	13,690	15,053	20,021	21,554	17,889	11,135	23,822	24,972	19,080	13,712	23,645
May	21,420	8,871	17,931	5,533	19,622	22,285	7,566	6,850	4,610	12,151	11,095	9,752
June	4,917	6,869	7,392	3,200	12,395	4,801	7,097	2,816	4,738	11,861	5,280	2,598
July	1,537	5,727	1,950	2,337	9,287	2,521	3,168	2,559	2,772	10,722	2,570	2,273
August	1,725	4,272	2,019	2,666	5,485	5,005	2,456	3,901	2,442	8,240	5,101	1,393
September	2,851	1,963	8,844	2,040	4,448	6,870	1,889	2,629	2,879	2,756	3,872	2,074
October	4,608	3,740	9,215	1,472	2,819	3,865	3,649	2,631	4,106	2,524	7,895	2,617
November	10,642	7,888	9,121	4,088	7,604	3,639	6,379	8,421	11,352	9,962	9,243	6,382
December	10,014	13,226	3,244	8,577	4,031	7,217	4,367	10,889	6,913	13,741	5,436	7,303

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a Report on Water Supply of the City of New York by the Merchants' Association, pp. 333-335.

Run-off of Hudson River at Mechanicville, Saratoga Co., N. Y., Calculated by means of the East Indian Engineers' Formula (*a*)—(Concluded.)

MEAN MONTHLY FLOW IN SECOND-FEET PER SQUARE MILE.

MONTH.	1888.	1889.	1900.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
January..	1.41	2.44	2.50	1.84	4.19	0.71	1.50	0.86	1.51	0.89	1.72	1.49
February.	0.82	0.84	1.76	2.58	2.06	1.07	1.08	0.79	1.04	0.87	1.50	1.17
March....	1.52	1.84	2.47	3.94	2.43	1.83	3.28	0.93	3.02	2.49	4.49	2.14
April.....	4.73	3.04	3.34	4.44	4.79	3.98	2.47	5.31	5.55	4.24	3.07	5.25
May......	4.76	1.97	4.00	1.22	4.36	4.95	1.68	1.52	1.02	2.70	2.47	2.17
June.....	1.09	1.52	1.64	0.71	2.76	1.07	1.58	0.63	1.05	2.64	1.17	0.58
July......	0.34	1.28	0.43	0.52	2.08	0.56	0.70	0.50	0.62	2.39	0.57	0.54
August...	0.38	0.95	0.45	0.59	1.22	1.11	0.55	0.87	0.54	1.83	1.13	0.31
September	0.63	0.44	1.96	0.45	0.99	1.53	0.41	0.58	0.51	0.51	0.84	0.46
October....	1.02	0.83	2.04	0.33	0.63	0.86	0.81	0.58	0.91	0.56	1.75	0.58
November	2.36	1.77	2.03	0.91	1.69	0.81	1.42	1.87	2.97	2.21	2.05	1.42
December	2.22	2.93	0.72	1.91	0.90	1.60	0.97	2.42	1.54	3.05	1.22	1.02

RUN-OFF IN INCHES ON DRAINAGE AREA.

MONTH.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
January..	1.62	2.81	2.89	2.12	4.83	0.82	1.73	1.99	1.74	1.03	1.97	1.71
February.	.89	0.88	1.83	2.70	2.22	1.09	1.12	0.82	1.12	0.90	1.56	1.22
March....	1.75	2.12	2.85	4.56	2.80	2.11	3.78	1.08	3.49	3.13	5.18	2.47
April.....	5.26	3.39	3.73	4.97	5.35	4.44	2.76	5.91	6.20	4.73	3.40	5.86
May......	5.49	2.27	4.59	1.42	5.03	5.71	1.94	1.76	1.18	3.04	2.83	2.49
June.....	1.22	1.70	1.83	0.79	3.08	1.19	1.76	0.70	1.18	2.94	1.30	0.65
July......	0.39	1.47	0.50	0.60	2.38	0.65	0.81	0.66	0.72	2.74	0.64	0.62
August...	0.44	1.09	0.52	0.68	1.41	1.28	0.63	1.00	0.63	2.41	1.30	0.36
September	0.71	0.49	2.19	0.51	1.10	1.70	0.47	0.65	0.71	0.68	0.96	0.56
October....	1.18	0.96	2.36	0.38	0.72	0.99	0.94	0.69	1.05	.65	2.12	0.67
November	2.64	1.96	2.26	1.01	1.89	0.90	1.58	2.08	2.82	2.47	2.29	1.58
December	2.57	3.39	0.83	2.27	1.03	1.85	1.12	2.79	1.77	3.67	1.40	.....

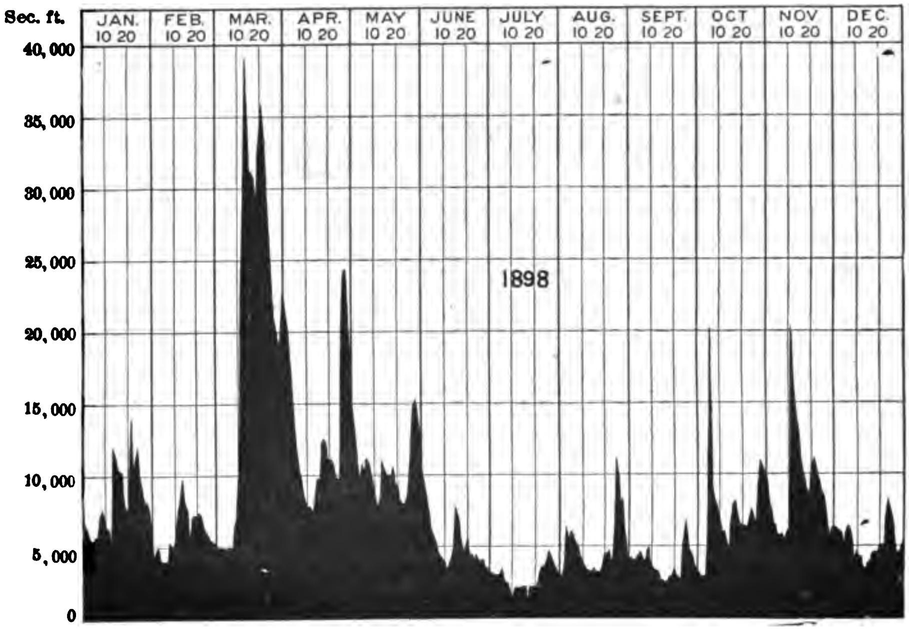
a Report on Water Supply of the City of New York by the Merchants' Association, pp. 333-335.

Mean Monthly Run-off of Hudson River at Mechanicville, Saratoga County, N. Y., Calculated by Means of Francis' Formula for Merrimac Dam.

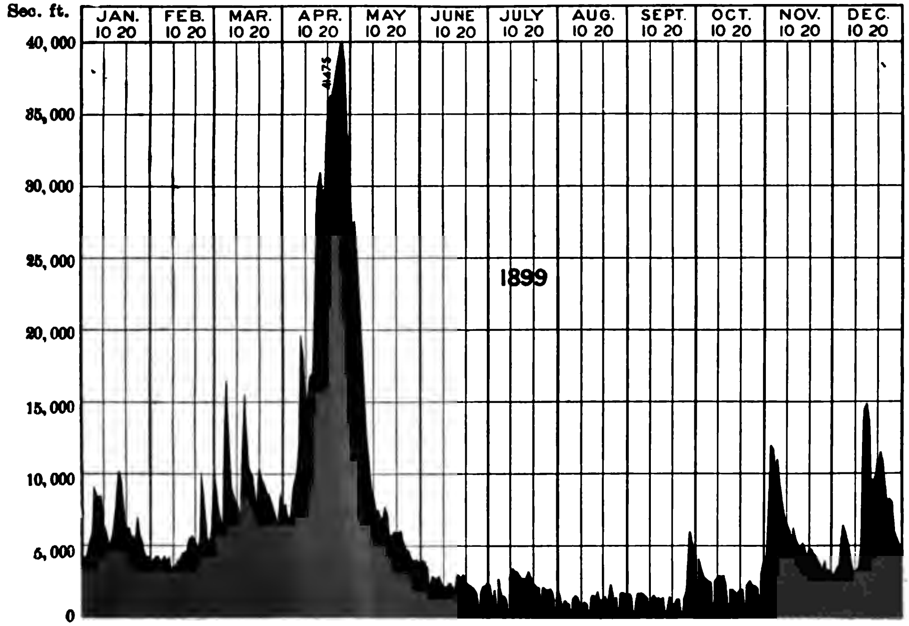
[Drainage area, 4,500 square miles.]

MEAN MONTHLY FLOW IN SECOND-FEET.

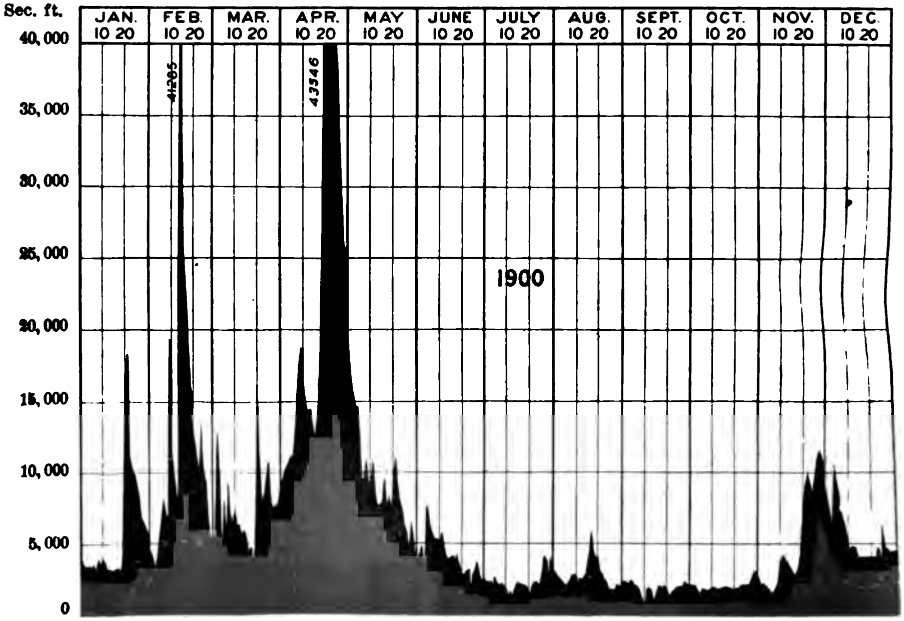
MONTH.	1898.	1899.	1900.	1901.	1902.
January..................................	8,173	6,437	5,841	3,087	....
February..................................	6,038	5,141	12,484	2,888	4,741
March..................................	19,617	9,316	7,740	8,095	25,130
April..................................	13,047	24,607	22,614	28,268	15,222
May..................................	10,525	9,591	8,992	11,658	7,949
June..................................	5,069	2,539	4,093	7,806	6,315
July..................................	2,751	2,402	2,352	3,551	8,934
August..................................	5,029	1,417	2,703	4,661	6,286
September..................................	3,810	2,054	1,886	4,024	3,643
October..................................	7,516	2.616	2,128	4,264	6,894
November..................................	8,978	6,066	5,077	3,732	7,076
December..................................	5,291	7,303	5,331	8,491	9,162



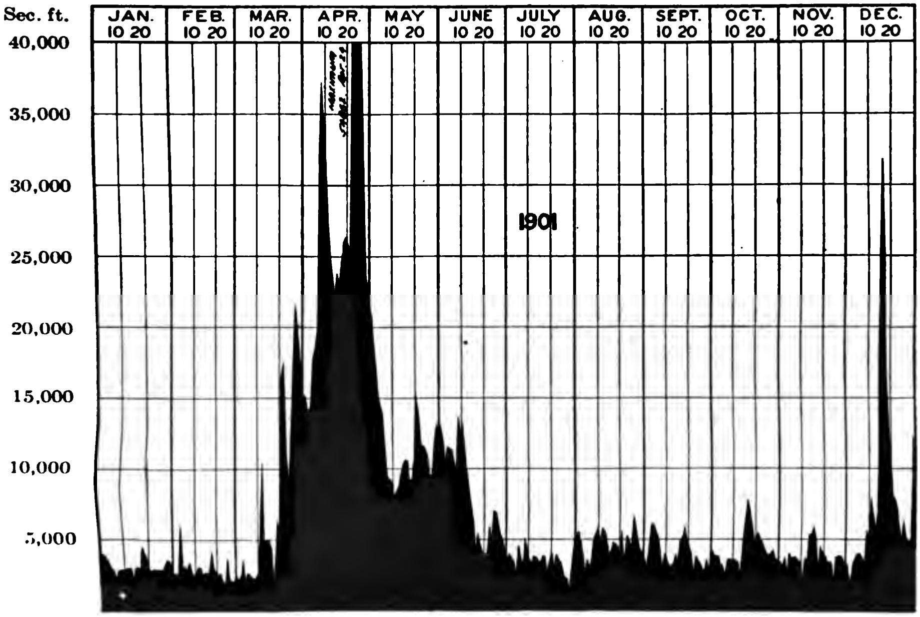
Discharge of Hudson River at Mechanicville, Saratoga County, N. Y., 1898.



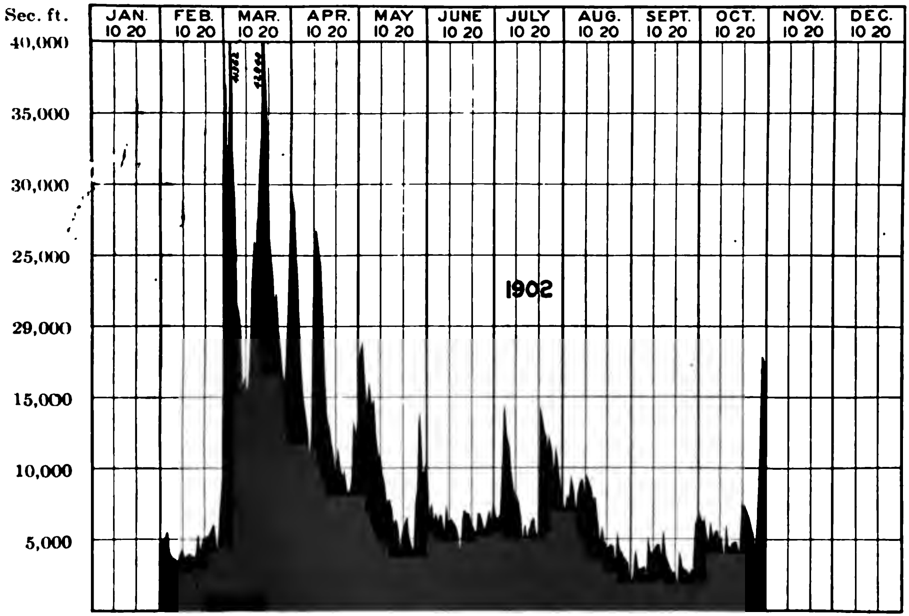
Discharge of Hudson River at Mechanicville, Saratoga County, N. Y., 1899.



Discharge of Hudson River at Mechanicville, Saratoga County, N. Y., 1900.



Discharge of Hudson River at Mechanicville, Saratoga County, N. Y., 1901.



Discharge of Hudson River at Mechanicville, Saratoga County, N. Y., 1902.

Mean Monthly Run-off of Hudson River at Mechanicville, Saratoga County, N. Y., Calculated by Means of Francis' Formula for Merrimac Dam—(Concluded.)

SECOND-FEET PER SQUARE MILE.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	1.81	1.43	1.30	.69	......
February	1.34	1.14	2.77	.64	1.52
March	4.36	2.07	1.72	1.80	5.53
April	2.90	5.47	5.02	6.28	3.38
May	2.34	2.11	2.00	2.60	1.76
June	1.12	0.56	0.91	1.73	1.40
July	0.61	0.53	0.52	.79	1.98
August	1.11	0.31	0.60	1.03	1.40
September	0.85	0.45	0.42	.89	.81
October	1.67	0.58	0.47	.94	1.53
November	1.99	1.36	1.11	.83	1.41
December	1.17	1.62	1.13	1.88	1.83

INCHES ON DRAINAGE AREA.

MONTH.	1898.	1899.	1900.	1901.	1902.
January	2.08	1.64	1.50	.79	......
February	1.39	1.18	2.88	.67	1.58
March	5.02	2.38	1.98	2.00	6.36
April	3.23	6.12	5.60	7.03	3.77
May	2.69	2.43	2.30	2.99	2.03
June	1.25	0.62	1.01	1.93	1.56
July	0.70	0.61	0.60	.91	2.28
August	1.28	0.35	0.69	1.18	1.61
September	0.95	0.50	0.47	1.00	.90
October	1.92	0.66	0.54	1.08	1.76
November	2.22	1.56	1.24	.92	1.58
December	1.35	1.86	1.36	2.16	2.11
Total	24.08	19.91	20.17	22.66	......

QUACKENKILL CREEK AT QUACKENKILL VILLAGE, RENSSELAER COUNTY, N. Y.

The headwaters of Quackenkill Creek lie in a series of storage ponds in central Rensselaer County. These ponds, four in number, have a combined water surface area of .15 square mile. They are situated at an average elevation of 1,485 feet above tide. Quackenkill is tributary to Poestenkill, and the ponds are utilized by mills at Troy to equalize the extremes of flow and increase the low water discharge of the latter stream. The watershed of the Quackenkill is for the most part cleared and precipitous. It is shown on the Hoosick, Cohoes, Berlin and Troy sheets of the Topographic Atlas of the United States Geological Survey.

A gauging record was maintained on the Quackenkill, below the lower highway bridge in Quackenkill Village, during 1894. A weir having a crest eight feet in length was erected across the stream, and observations of the depth on the weir at a stake a short distance upstream were taken daily. The discharge was calculated by the Francis formula. The drainage area above the point of gauging is 18.5 square miles, and above the junction of the stream with the Potestenkill is 30.5 square miles.

The record has been furnished by William G. Raymond, Consulting Engineer of Department of Water Supply of Troy.

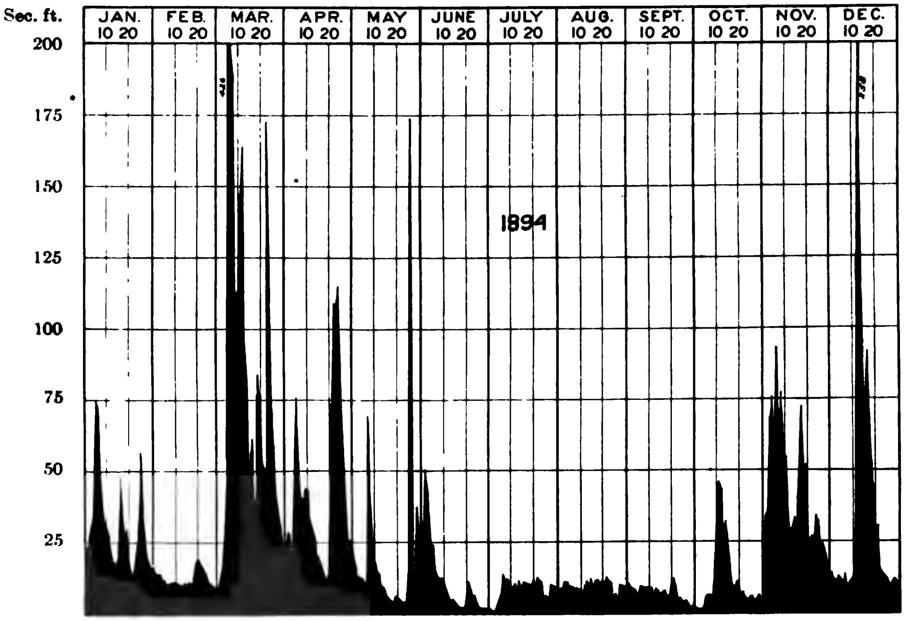
Monthly Run-off of Quackenkill at Quackenkill, Rensselaer County, N. Y.

[Drainage area, 18.5 square miles.]

MONTH.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
1894.			
January	30.0	1.62	1.87
February	12.3	.66	.69
March	88.5	4.56	5.24
April	41.7	2.25	2.51
May	19.7	1.65	1.90
June	10.5	.56	.62
July	8.4	.43	.49
August	9.4	.51	.59
September	6.8	.37	.41
October	11.4	.62	.71
November	42.5	2.29	2.55
December	39.4	2.13	2.46
Year			20.04

During 1894 draught from the storage ponds, situated about four miles above the weir, began July 2 and continued until the storage became exhausted, about September 25th.

The period of minimum flow during the time when storage supply was not being used, June 26 to July 3, inclusive, shows a mean flow for eight days of 1.4 second-feet, or .076 second-feet per square mile. The maximum recorded flow of 426.4 second-feet is equivalent to 23.1 second-feet per square mile. This occurred on March 7, 1894.



Discharge of Quackenkill Creek at Quackenkill, Rensselaer County, N. Y., 1894.

Mean Daily Flow, in Second-feet, of Quackenkill Creek at Quackenkill Village. Rensselaer County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1894.												
1	23.9	13.8	8.9	29.4	15.7	31.8	1.2	8.7	10.2	1.3	34.3	14.6
2	27.7	14.6	14.7	27.2	14.4	50.1	.9	8.7	8.6	1.3	36.0	11.7
3	31.6	13.3	23.9	17.4	14.3	41.1	.5	10.8	8.5	1.3	68.9	9.2
4	36.2	11.9	31.7	32.3	12.5	25.0	2.1	10.6	7.6	2.1	75.8	12.9
5	75.2	12.2	55.5	76.6	12.3	23.5	3.2	8.7	6.0	3.6	59.8	11.7
6	73.2	10.4	269.6	53.5	9.8	16.2	6.4	8.5	9.6	6.0	94.2	10.9
7	51.7	10.6	426.4	40.4	68.8	12.3	13.2	9.3	8.8	6.1	55.1	13.8
8	35.2	11.0	189.2	39.0	41.9	11.1	11.7	8.9	8.1	4.8	77.4	9.3
9	31.7	11.5	114.4	44.3	26.6	12.2	11.9	8.3	8.3	9.6	56.9	10.2
10	22.9	11.8	111.7	42.8	17.4	9.2	9.8	7.0	8.2	34.7	54.3	11.8
11	27.8	11.0	145.3	33.5	14.9	8.2	8.3	7.3	8.9	46.7	39.3	13.8
12	20.3	11.0	164.8	28.9	13.2	5.3	10.7	7.3	6.5	42.9	29.6	125.9
13	18.9	10.2	99.3	26.9	8.7	4.2	8.2	7.8	8.5	28.3	29.4	257.9
14	18.5	11.0	83.7	22.6	9.0	4.8	12.1	7.1	7.8	32.0	34.1	141.4
15	19.1	10.8	50.6	20.2	6.8	3.6	9.4	7.3	6.3	23.1	31.9	90.4
16	47.7	11.5	60.5	19.3	5.2	2.3	11.2	6.9	6.5	17.3	52.1	63.4
17	33.4	10.2	33.2	15.7	4.1	2.1	11.1	6.6	6.6	9.7	72.5	93.3
18	27.0	12.4	45.1	14.6	4.2	2.1	10.1	7.4	5.1	9.0	51.1	67.7
19	30.0	19.6	84.5	12.2	5.5	2.0	10.1	8.7	5.5	11.9	51.8	53.8
20	17.4	19.8	65.4	14.0	5.6	5.3	12.0	12.2	10.1	7.0	23.7	34.4
21	14.2	17.1	52.9	74.1	4.1	11.1	9.5	13.5	12.2	6.2	25.6	20.8
22	14.8	15.1	50.4	109.3	3.9	9.3	12.8	12.6	9.5	7.4	26.8	30.2
23	20.7	14.3	173.5	109.7	3.7	5.1	11.9	13.6	3.8	5.5	22.8	15.1
24	27.4	13.5	107.8	115.0	3.9	6.0	10.3	13.4	5.3	4.3	34.3	13.4
25	57.0	10.7	70.3	72.7	12.8	2.8	5.7	11.0	4.3	5.2	31.9	12.3
26	30.7	9.9	58.3	53.2	174.1	1.8	6.0	10.2	3.5	5.3	24.6	11.3
27	26.5	9.2	42.8	33.9	12.8	1.8	4.1	10.2	4.0	4.1	24.3	9.9
28	20.0	8.7	35.5	26.1	12.9	1.8	9.9	10.2	2.6	4.7	19.4	10.4
29	17.6	.....	29.7	25.9	37.0	1.7	9.4	10.2	1.7	5.9	15.2	12.3
30	16.8	.....	22.4	21.7	24.3	1.7	9.4	10.2	1.7	3.7	12.8	11.2
31	17.0	.....	22.8	.....	21.5	.....	9.5	9.7	.....	4.0	.....	10.4
Mean	30.0	12.3	88.5	41.7	19.7	10.5	8.4	9.4	6.8	11.4	42.5	39.2

DRAINAGE TRIBUTARY TO LOWER HUDSON RIVER AND LONG ISLAND SOUND.

KINDERHOOK CREEK AT EAST NASSAU AND WILSON'S DAM, RENSSELAER COUNTY, N. Y.

Gaugings of this stream were conducted by the Albany Water Department during the years 1892, 1893 and 1894, the results of which are of interest in connection with measurements of surrounding watersheds like Ten-Mile, Housatonic and Fishkill, proposed possible sources of municipal supply for New York city.

The original Kinderhook gaugings have been furnished for calculation by George I. Bailey, Superintendent of the Albany Bureau of Water.

Kinderhook Creek is an interstate stream having its source in Hancock Mountains, Massachusetts. It flows in a southwesterly direction through Rensselaer and Columbia Counties, N. Y., debouching into Hudson River at Stockport. Its tributary drainage is divided between New York and Massachusetts, as follows:

Drainage in New York	304.7 square miles
Drainage in Massachusetts	29.3 square miles
Total drainage above mouth	334.0 square miles

A gauging record was kept at a weir erected across the stream above East Nassau, July 28 to November 30 inclusive, 1892. The record included the flow over the thin-edged weir or dam and the flow in the tailrace of the adjoining mill. Readings of the gauge height at both dam and race were taken at 30-minute intervals, from 6.30 p. m. to 7 a. m. each day, and the flow for the several one-half hour periods were summated to obtain the total yield during the night.

The measurements in the main stream were taken at a compound weir consisting of a lower central section 50.17 feet in length, over which the entire flow passed at ordinary stages of the stream; the remainder of the dam, having a length of 92.33 feet, was raised and leveled by means of a 2-inch plank to an elevation 1.20 feet above the central thin plate weir. Whenever the head exceeded 1.2 feet on the lower section, the water flowed over the entire dam 142.5 feet in length. The discharge has been computed by means of the Francis formula, allowing for two complete end contractions for all depths on the lower section.

The drainage area above the East Nassau gauging station is 120.5 square miles.

A second gauging station was established on Kinderhook Creek at Wilson's mill below Garfield Reservoir July 14, 1893, and a record maintained from that date until December 31, 1894.

The drainage area above the weir at Wilson's Dam is 68.2 square miles or 57 per cent. of that at East Nassau. Readings were taken at this weir at 6 a. m., 12 m. and 6 p. m. of each day.

The principal dimensions of the weir, which was of the compound variety, were as follows:

Total length of dam	99.22 feet
Length of central lower overflow	25.00 feet
Length of right overflow of main dam	37.95 feet
Length of left overflow, main dam	36.27 feet
Total length of upper overflow	74.22 feet
Difference of elevation of two spillways July 1, to May 25, 1894	1.00
Difference of elevation of two spillways May 27, to December 31, 1894	0.89 foot

The accompanying tables show the mean daily flow in second-feet at the two Kinderhook stations for the periods during which the records were kept. The summary for Wilson's Dam includes the rainfall on the watershed from a private record kept at that station in 1894.

Mean Monthly Run-off of Kinderhook Creek at East Nassau, Rensselaer County, N. Y.
[Drainage area, 120 square miles.]

	Maximum, second-feet.	Minimum, second-feet.	Mean, second-feet.	Mean, second-feet, per square mile.	Run-off, inches on drainage area.
1892.					
August	362.4	37.0	97.8	0.81	0.93
September	134.6	35.0	68.7	0.55	0.62
October	44.0	28.5	34.7	0.29	0.33
November	531.5	30.1	121.5	1.01	1.13
December	....	....	....	....	....
1894.					
January	....	....	143.7	1.19	1.37
February	....	....	74.7	0.62	0.64
March	....	....	351.4	3.74	4.30
April	....	....	155.4	1.29	1.44
May	....	....	....	....	....
June	....	....	105.2	0.87	0.97
July	....	....	30.5	0.25	0.29
August	....	....	15.5	0.13	0.15
September	....	....	25.4	0.21	0.24
October	....	....	49.4	0.41	0.46
November	....	....	....	....	....
December	....	....	....	....	....

Mean Monthly Run-off of Kinderhook Creek at Wilson's Dam, Rensselaer County, N. Y.
[Drainage area, 68 square miles.]

	Maximum, second-feet.	Minimum, second-feet.	Mean, second-feet.	Mean second-feet, per square mile.	Run-off, inches on drainage area.
1893.					
July	53.8	11.8	24.9	0.37	0.43
August	256.4	8.2	44.8	0.66	0.76
September	191.2	23.6	69.7	1.02	1.14
October	126.6	30.2	64.8	0.95	1.09
November	93.2	32.2	55.5	0.82	0.92
December	338.7	45.3	121.7	1.79	2.06

Mean Monthly Run-off of Kinderhook Creek at Wilson's Dam, Rensselaer County, N. Y., for 1894
[Drainage area, 68 square miles.]

MONTH.	Maximum, second-feet.	Minimum, second-feet.	Mean, second-feet.	Mean, second-feet per square mile.	Run-off, inches on drainage area.	Rainfall at Wilson's Dam, inches.	Ratios of run-off to rainfall.
January	160.6	44.8	81.8	1.20	1.38	2.14	.64
February	74.1	33.0	42.6	0.63	0.66	1.36	.48
March	608.9	40.9	200.3	2.94	3.38	0 28	12 07
April	151.6	58.9	88.7	1.30	1.46	1.23	1.19
May	160.8	30.8	60.0	0.88	1.01	4.35	23
June	98.9	16.3	45.7	0.82	0.92	2.40	.42
July	48.8	8.7	17.5	0.26	0.30	3.33	.09
August	16.6	5.2	8.9	0.13	0.15	0.70	.21
September	54.6	4.1	14.5	0.21	0.24	3.15	.07
October	68.5	9.3	28.2	0.41	0.47	4.14	.11
November	164.5	46.5	88.9	1.31	1.47	2.40	.61
December	451.1	44.0	125.3	1.85	2.13	2.51	.85
Year	....	....	......	......	13.57	27.99	.49

Mean Daily Flow, in Second-feet, of Kinderhook Creek at East Nassau, Rensselaer County, N. Y
[Drainage area, 120 square miles.]

DAY.	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1892.												
1	.....	.....	.....	.....	.....	.....	.....	125.39	96.72	31.62	31.93	.....
2	.....	.....	.....	.....	.....	.....	.....	86.73	83.39	30.54	30.07	.....
3	.....	.....	.....	.....	.....	.....	.....	69.42	69.44	31.62	40.61	.....
4	.....	.....	.....	.....	.....	.....	.....	59.90	63.39	31.93	51.93	.....
5	.....	.....	.....	.....	.....	.....	.....	53.35	58.12	32.55	95.79	.....
6	.....	.....	.....	.....	.....	.....	.....	47.11	134.69	44.02	65.41	.....
7	.....	.....	.....	.....	.....	.....	.....	46.90	102.92	43.71	52.08	.....
8	.....	.....	.....	.....	.....	.....	.....	40.40	76.72	34.25	51.15	.....
9	.....	.....	.....	.....	.....	.....	.....	37.28	61.69	41 23	47.74	.....
10	.....	.....	.....	.....	.....	.....	.....	61.15	58.12	33.79	59.83	.....
11	.....	.....	.....	.....	.....	.....	.....	81.74	51.61	31.46	76.10	.....
12	.....	.....	.....	.....	.....	.....	.....	273.54	44.48	35.18	72.07	.....
13	.....	.....	.....	.....	.....	.....	.....	159.68	39.22	36.27	65.87	.....
14	.....	.....	.....	.....	.....	.....	.....	110.67	111.14	36.12	61.69	.....
15	.....	.....	.....	.....	.....	.....	.....	78.95	126.32	36.12	58.12	.....
16	.....	.....	.....	.....	.....	.....	.....	66.03	76.88	38.28	221.25	.....
17	.....	.....	.....	.....	.....	.....	.....	56.73	67.89	37.97	531.48	.....
18	.....	.....	.....	.....	.....	.....	.....	47.27	63.08	38.59	281.40	.....
19	.....	.....	.....	.....	.....	.....	.....	50.37	52.23	38.13	329.28	.....
20	.....	.....	.....	.....	.....	.....	.....	89.59	44.33	42.78	238.42	.....
21	.....	.....	.....	.....	.....	.....	.....	46.65	.....	38.13	189.39	.....
22	.....	.....	.....	.....	.....	.....	.....	45.10	48.05	34.56	166.73	.....
23	.....	.....	.....	.....	.....	.....	.....	44.33	40.30	33.63	144.77	.....
24	.....	.....	.....	.....	.....	.....	.....	39.99	92.38	32.24	119.04	.....
25	.....	.....	.....	.....	.....	.....	.....	46.65	107.42	28.52	99.51	.....
26	.....	.....	.....	.....	.....	.....	.....	362.39	61.69	28.67	96.72	.....
27	.....	.....	.....	.....	.....	.....	.....	294.76	49.14	30.38	97.34	.....
28	.....	.....	.....	.....	.....	.....	32.24	187.75	39.22	30.85	88.19	.....
29	.....	.....	.....	.....	.....	.....	37.20	142.60	35.03	30.23	90.67	.....
30	.....	.....	.....	.....	.....	.....	101.37	99.51	36.58	31.62	91.76	.....
31	.....	.....	.....	.....	.....	.....	84.94	96.72	.....	30.85	.....	.....
Mean	.....	.....	.....	.....	.....	.....	63.90	97.80	68.70	34.70	121.50	.....

Mean Daily Flow, in Second-feet, of Kinderhook Creek at Wilson's Dam, N. Y.
[Drainage area, 68 square miles.]

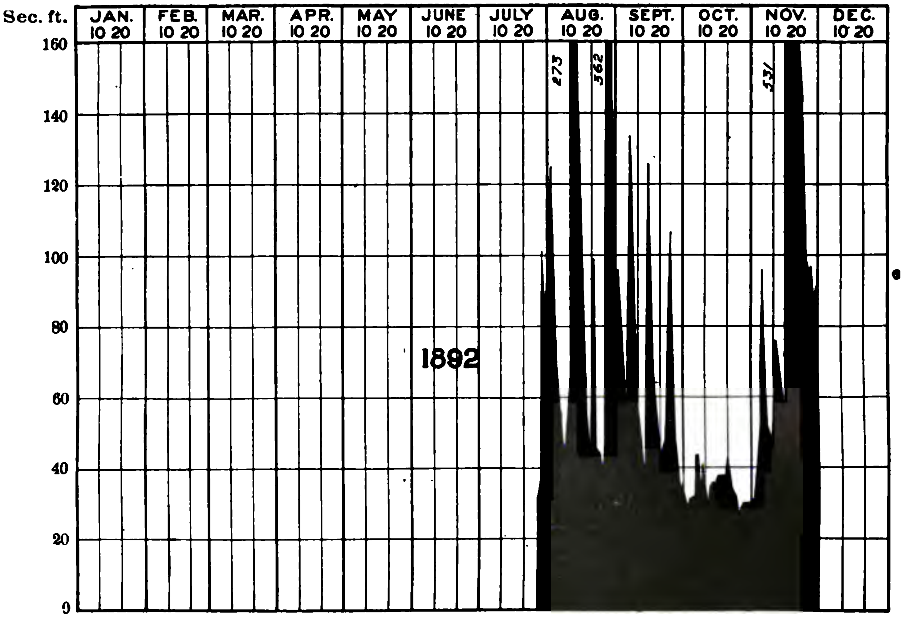
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1893.												
1	.....	.....	.....	.....	.....	.....	33.0	15.2	60.9	90.7	73.2	68.8
2	.....	.....	.....	.....	.....	.....	53.8	13.0	47.4	71.5	64.9	56.6
3	.....	.....	.....	.....	.....	.....	36.1	12.3	38.4	60.0	68.5	67.1
4	.....	.....	.....	.....	.....	.....	31.8	11.2	35.7	56.0	73.8	158.1
5	.....	.....	.....	.....	.....	.....	29.9	10.9	31.5	53.6	73.9	101.4
6	.....	.....	.....	.....	.....	.....	25.9	10.2	27.7	49.9	65.9	97.5
7	.....	.....	.....	.....	.....	.....	22.0	30.0	38.1	66.8	60.3	93.2
8	.....	.....	.....	.....	.....	.....	26.5	50.7	81.7	63.1	58.7	80.1
9	.....	.....	.....	.....	.....	.....	36.7	30.1	53.6	51.9	54.6	80.0
10	.....	.....	.....	.....	.....	.....	27.0	19.5	37.7	47.3	50.7	83.2
11	.....	.....	.....	.....	.....	.....	22.0	14.5	31.9	55.5	47.4	67.7
12	.....	.....	.....	.....	.....	.....	27.6	13.4	28.1	50.2	46.2	63.6
13	.....	.....	.....	.....	.....	.....	47.9	11.2	26.0	61.7	46.0	47.0
14	.....	.....	.....	.....	.....	.....	30.4	10.4	23.6	111.6	45.4	45.3
15	.....	.....	.....	.....	.....	.....	23.6	9.2	61.7	85.9	42.8	67.6
16	.....	.....	.....	.....	.....	.....	21.1	8.3	191.2	66.2	42.2	211.2
17	.....	.....	.....	.....	.....	.....	19.8	9.2	156.3	58.0	43.2	338.7
18	.....	.....	.....	.....	.....	.....	20.3	11.3	103.1	50.1	45.1	241.4
19	.....	.....	.....	.....	.....	.....	17.2	11.1	109.7	47.1	47.1	165.6
20	.....	.....	.....	.....	.....	.....	15.1	13.6	128.8	44.8	43.6	110.8
21	.....	.....	.....	.....	.....	.....	12.5	12.2	87.9	32.4	42.3	127.7
22	.....	.....	.....	.....	.....	.....	13.5	10.3	70.4	30.2	51.3	155.0
23	.....	.....	.....	.....	.....	.....	13.9	9.1	63.9	46.3	54.7	149.4
24	.....	.....	.....	.....	.....	.....	13.0	82.6	57.5	66.8	47.3	147.9
25	.....	.....	.....	.....	.....	.....	11.8	133.9	61.4	58.9	41.2	171.9
26	.....	.....	.....	.....	.....	.....	21.2	94.1	68.4	51.3	32.4	172.6
27	.....	.....	.....	.....	.....	.....	40.0	64.3	56.4	55 2	42.2	136.2
28	.....	.....	.....	.....	.....	.....	24.6	154.1	50.1	126.6	89.0	119.2
29	.....	.....	.....	.....	.....	.....	20.0	256.4	134.4	120.3	93.2	123.8
30	.....	.....	.....	.....	.....	.....	19.7	167.2	128.5	96.6	78.6	126.2
31	.....	.....	.....	.....	.....	.....	16.7	88.7	.....	83 9	.....	96.3
Mean	.....	.....	.....	.....	.....	.....	25.0	44.8	69.8	64.8	55.5	121.7

Mean Daily Flow in Second-feet of Kinderhook Creek at Wilson's Dam, N. Y.—(Concluded).

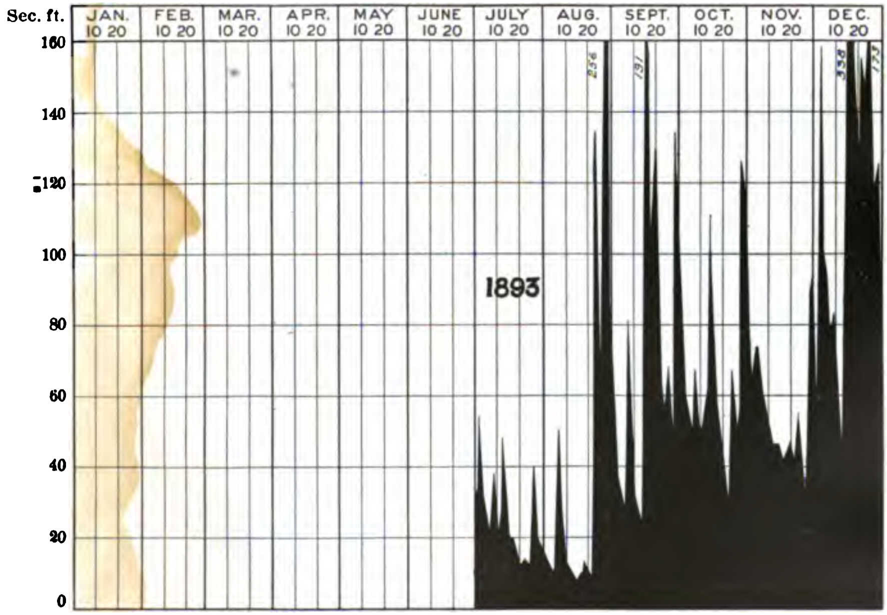
DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1894.												
1	76.9	66.0	40.9	93.9	67.4	98.9	15.5	13.8	5.5	9.3	73.8	57.2
2	77.2	59.5	49.6	83.2	61.2	96.7	14.1	12.0	4.1	9.9	51.9	56.0
3	81.8	63.2	66.2	73.2	57.8	90.8	17.2	12.9	6.6	15.7	133.1	51.5
4	88.5	58.0	96.6	87.1	58.1	80.8	18.9	16.6	6.7	35.0	164.5	53.9
5	115.5	45.0	156.5	101.2	63.2	67.3	17.8	14.5	7.2	34.7	130.5	57.5
6	113.9	45.1	315.9	88.2	62.9	60.8	25.9	13.0	6.1	29.1	159.8	48.4
7	91.9	47.6	608.9	80.1	87.7	55.6	48.3	9.1	6.1	23.6	124.1	49.8
8	84.3	49.8	457.1	82.2	74.9	58.3	29.9	8.1	6.6	18.0	104.2	45.9
9	77.0	49.8	343.4	84.9	56.7	51.0	23.1	9.6	8.9	18.4	96.0	44.3
10	71.0	47.6	305.4	86.4	48.2	43.2	17.4	8.9	13.1	39.5	95.9	48.2
11	71.1	45.6	325.6	78.4	47.1	39.8	14.3	8.4	17.2	68.5	90.7	48.7
12	53.3	36.9	330.4	76.4	48.2	37.5	17.4	7.9	13.1	49.0	75.6	288.2
13	44.8	33.0	267.9	76.9	40.8	32.6	14.8	8.3	10.6	43.7	65.4	452.0
14	67.7	45.0	232.3	76.3	38.0	34.4	13.2	8.0	12.4	41.5	66.7	270.7
15	78.6	43.1	189.0	70.1	37.4	26.5	13.7	9.9	14.9	44.8	65.7	189.3
16	160.6	39.1	160.6	64.3	34.4	25.9	13.4	11.3	15.2	34.9	83.1	169.4
17	118.3	39.7	150.7	61.2	30.8	23.4	12.6	9.4	22.5	29.1	104.8	185.9
18	79.2	55.7	155.7	59.1	36.3	23.9	12.1	7.8	19.8	26.2	100.3	163.4
19	81.2	74.1	190.4	58.9	46.8	40.9	10.8	6.8	20.0	26.0	85.6	135.8
20	66.0	63.9	204.4	68.8	40.8	78.7	10.7	8.2	54.6	21.7	75.8	123.4
21	78.7	52.7	167.7	123.8	33.6	67.0	12.3	8.2	37.5	19.1	66.5	111.9
22	72.9	44.6	163.9	129.6	31.6	51.8	22.6	8.5	24.2	19.2	64.5	109.4
23	62.6	40.8	234.6	151.6	37.4	36.1	17.7	5.8	16.6	19.4	65.6	87.0
24	73.0	33.5	220.8	143.8	63.4	27.1	13.1	7.2	16.1	20.6	98.4	70.4
25	129.6	37.8	175.6	123.5	81.2	22.9	13.0	6.1	14.7	23.7	95.3	78.6
26	88.7	36.1	144.5	105.7	72.4	22.0	10.5	5.4	12.4	28.4	82.6	57.8
27	83.5	33.3	107.6	91.8	58.8	22.9	10.1	5.3	11.7	25.9	77.7	38.3
28	68.8	35.0	91.3	84.5	70.4	22.2	8.7	5.7	11.2	22.2	65.9	48.4
29	59.1	.....	88.8	78.3	160.8	19.1	14.5	5.4	10.1	19.1	46.5	51.8
30	60.1	.....	83.4	73.8	112.4	16.3	36.0	5.7	9.1	16.6	51.5	52.9
31	64.5	.....	84.0	.....	98.9	.....	21.1	7.0	.....	40.9	.....	54.7
Mean	81.8	42.6	200.3	88.7	60.0	45.7	17.5	8.9	14.5	28.2	88.9	125.3

NORMANSKILL AT FRENCH'S MILL, ALBANY COUNTY, N. Y.

The Normanskill drains an area of 168 square miles, lying between the lower Mohawk watershed and the northern drainage slope of the Catskill Mountains, and including a portion of the counties of Albany and Schenectady. The stream enters tide water of Hudson River at Kenwood, a suburb of Albany. A gauging record, showing the flow of this stream from June 1 to December 1, 1891, is of interest in connection with measurements of flow from the adjacent Catskill and Schoharie watersheds, proposed as possible sources of supply for Greater New York. The volume of flow was determined by means of weirs erected at French's Mill, by the Bureau of Water of Albany. Mr. George I. Bailey, Superintendent of the Bureau, has furnished the original records for computation. The stream is at an elevation of 200 feet above tide at the point where gauged, and receives the drainage from an area of 110.6 square miles or 66 per cent. of the entire watershed.



Discharge of Kinderhook Creek at East Nassau, Rensselaer County, N. Y., 1892.



Discharge of Kinderhook Creek at Wilson's Dam, Rensselaer County, N. Y., 1893.

Below French's Mill the stream follows a tortuous valley relatively deep and narrow, its bank rising abruptly from the flood plain. The topography of the lower Normanskill is shown on the Albany sheet of the Geological Survey Map.

Mean Daily Flow in Second-feet of Normanskill at French's Mill, Albany County, N. Y.

[Drainage area, 111 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1891.												
1	....	....	....	....	....	25.57	10.38	8.84	8.24	8.99	7.98	20.15
2	....	....	....	....	....	20.31	14.52	8.53	18.44	10.09	9.84	18.91
3	....	....	....	....	....	44.64	12.76	12.71	12.23	7.78	7.98	17.98
4	....	....	....	....	....	44.64	11.39	8.74	9.39	4.87	9.68	24.49
5	....	....	....	....	....	44.64	11.39	16.89	9.14	7.94	8.14	226.90
6	....	....	....	....	....	31.46	10.38	11.98	14.15	7.07	9.04	119.51
7	....	....	....	....	....	24.18	10.07	9.08	9.96	6.71	8.00	95.02
8	....	....	....	....	....	18.44	14.52	8.89	8.52	34.10	6.97	73.62
9	....	....	....	....	....	18.29	11.95	8.52	7.57	15.08	8.42	51.15
10	....	....	....	....	....	17.21	9.30	8.84	7.22	9.93	10.31	49.44
11	....	....	....	....	....	18.29	9.30	8.25	6.22	8.84	8.14	44.02
12	....	....	....	....	....	37.82	8.99	10.86	6.49	10.58	16.69	39.83
13	....	....	....	....	....	23.87	8.09	8.77	6.77	8.68	14.21	29.61
14	....	....	....	....	....	24.18	7.50	7.93	9.14	9.47	13.03	27.43
15	....	....	....	....	....	22.16	8.09	7.65	7.66	8.46	9.84	26.66
16	....	....	....	....	....	22.32	7.78	7.93	7.05	9.30	10.63	67.27
17	....	....	....	....	....	17.21	7.50	7.21	7.05	8.09	11.46	47.89
18	....	....	....	....	....	33.48	7.35	7.21	7.50	6.09	25.27	51.60
19	....	....	....	....	....	35.96	10.65	7.21	7.50	10.24	16.22	49.60
20	....	....	....	....	....	37.51	9.15	6.65	6.22	8.84	14.43	37.97
21	....	....	....	....	....	35.34	18.29	6.77	7.15	23.41	15.33	32.71
22	....	....	....	....	....	33.48	9.93	6.49	6.09	12.07	13.71	31.77
23	....	....	....	....	....	31.46	9.55	6.22	7.07	13.09	18.09	137.17
24	....	....	....	....	....	29.45	11.83	6.62	6.49	11.57	142.89	479.49
25	....	....	....	....	....	20.92	11.16	7.24	7.05	9.14	75.81	502.54
26	....	....	....	....	....	19.68	10.74	5.94	7.66	9.93	46.33	391.84
27	....	....	....	....	....	18.29	9.15	9.26	5.38	10.09	40.09	279.12
28	....	....	....	....	....	16.27	7.94	16.12	5.55	9.62	35.41	129.27
29	....	....	....	....	....	10.38	8.25	8.96	4.65	8.68	22.71	70.53
30	....	....	....	....	....	10.07	8.09	7.93	6.77	9.14	18.72	858.76
31	....	....	....	....	....	.....	10.46	8.37	.....	9.30	......	......
Mean	....	....	....	....	....	26.2	10.2	8.7	8.1	10.6	21.7	57.2

Mean Monthly Run-off of Normanskill at French's Mill, Albany County, N. Y.

[Drainage area, 111 square miles.]

DATE.	Maximum, second-feet.	Minimum, second-feet.	Mean, second-feet.	Mean, second-feet per square mile.	Run-off, inches on drainage area.
1891.					
June	44.6	10.1	26.2	0.24	0.27
July	18.1	7.3	10.2	0.09	0.10
August	16.7	5.9	8.7	0.08	0.09
September	18.4	4.6	8.1	0.07	0.08
October	34.1	4.9	10.6	0.10	0.11
November	142.0	6.9	21.7	0.20	0.22
December	84.3	18.0	57.2	0.51	0.59

GAUGING OF STREAMS PROPOSED AS SOURCES OF PUBLIC WATER SUPPLY FOR NEW YORK CITY.

Through the co-operation of the Department of Water Supply of New York, George W. Birdsall, Chief Engineer, a series of gaugings of streams which have been proposed as possible source of future municipal water supply for Greater New York have been undertaken. The gaugings include streams draining, for the most part, timber covered mountainous areas in southeastern New York State, on both the Catskill and Connecticut sides of Hudson River.

In June, 1901, a reconnaissance was made of Catskill and Esopus Creek, Wallkill River and Rondout Creek, west of the Hudson; and Fishkill Creek and Ten Mile River, east of the Hudson. Nearly the entire length of each stream was traversed and a site for a gauging station selected on each. Early in July the stations were established, with the exception of that on Ten Mile River. Persons living near at hand were employed as gauge readers to take observations of the stage of the stream twice each day.

One object of the gaugings has been to determine the available run-off for storage of the several streams, at sites selected for storage reservoirs.[a] It was not practicable in most cases to locate a gauging station precisely at the foot of the watershed tributary to the proposed reservoir. The relation between the estimated drainage area at the reservoir sites and at the gauging station on each stream is shown below:

STREAM.	Location of gauging station.	Drainage Area in Sq. Miles.		
		Above proposed reservoir.	Above gauging station.	Above mouth.
Ten Mile River	Dover Plains, N. Y.	200	195	195
Housatonic River	Gaylordsville, Conn.	1,020	1,020	1,580
Catskill Creek	South Cairo, N. Y.	140	260	394
Esopus Creek	Kingston, N. Y.	242	312	417
Wallkill River	New Paltz, N. Y.	464	735	779
Rondout Creek	Rosendale, N. Y.	184	365	[b]369
Fishkill Creek	Glenham, N. Y.	158	198	204

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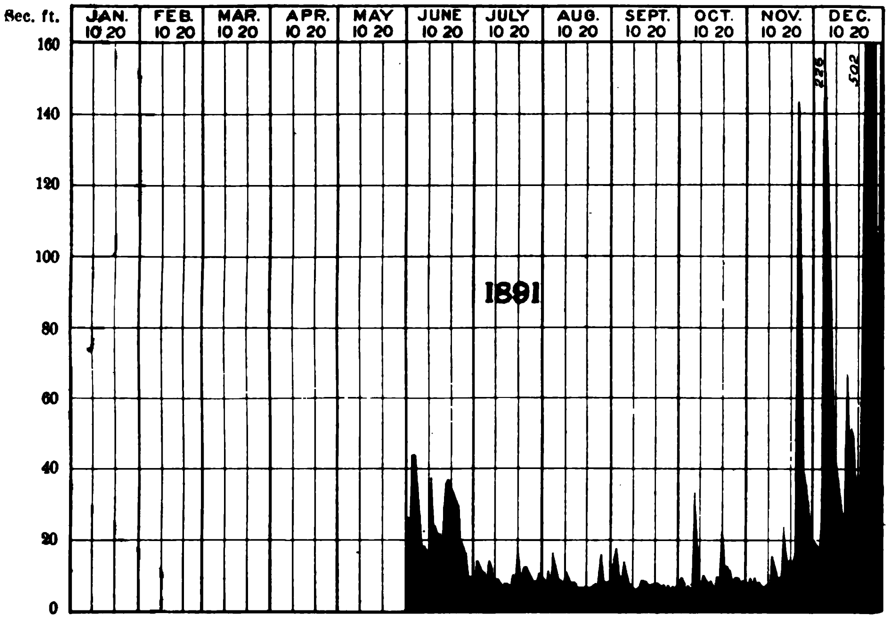
[a] These reservoirs are described in the Report on New York's Water Supply, by John R. Freeman.

[b] Above junction with Wallkill River.



Discharge of Normans Kill at French's Mills, Albany County, N. Y., 1891.

The gaugings at each of the stations referred to in the table are made by means of the current meter; the discharge measurements during 1901 having mostly been made by resident hydrographers A. E. Place and W. W. Schlecht, and during 1902 by H. K. Barrows, P. M. Churchill and F. H. Tillinghast. Velocity observations are taken at horizontal intervals of five feet across the entire width of the channel, the current meter being submerged 0.6 depth of the sounding at each 5 foot station. In order to determine whether the velocity so obtained is the true mean velocity desired, observations of velocities in vertical planes have been take at intervals of 0.5 foot of depth from surface to bottom. At a number of the stations the stream-bed consists of a rock strata overlaid with inwashed sand or gravel. The vertical velocity observations are repeated from time to time to determine whether these deposits have shifted in position in such a way as to sensibly affect the rating curve of the cross sections. During the winter similar vertical velocity curves are obtained to determine the effect of the increased wetted perimeter due to ice covering the stream.

Wallkill, Housatonic, and Ten Mile Rivers are interstate streams. The first receives tributary drainage from New York, but does not itself flow through New York State. Ten Mile River lies mostly in New York, though the lower few miles of its course and its mouth are in Connecticut. Wallkill River has its headwaters in New Jersey, but most of its channel and watershed, as well as its outlet, are in New York.

The results of gaugings at a station on Housatonic River, established in 1900 by the United States Geological Survey, and of gaugings of Croton River by the Department of Water Supply of New York, have been included in this division of the report.

CATSKILL CREEK AT SOUTH CAIRO, GREENE COUNTY, N. Y.

The drainage basin of this stream receives the run-off from the north slope of the Catskill Range, and lies, for the most part, in the timbered highlands of Greene County. Its source is in a swamp at Franklinton, the opposite side of which drains into Schoharie Creek. The stream enters tide water of Hudson River at Catskill. The lowest two miles of its course, below the influx of Kaaterskill Creek, being slack water. From Kaaterskill Creek, to Leeds, a distance of three miles, it flows through a gorge formed of tilted strata of bluestone, affording within this distance a fall of 180 feet. The topography of the watershed is shown on the Durham, Coxsackie, and Catskill Atlas Sheets of the United States Geological Survey. The stream flows over a rock bed through much of its course. The slopes of the drainage basin are precipitous and there are no lakes, and little artificial storage. The stream is subject to wide variations in flow. High water marks observed at the Woodstock Dam, indicate a freshet discharge in the spring of 1901, of 21,000 second-feet, or 100 second-feet per square mile from the tributary drainage area of 210 square miles.

The principal tributary of Catskill Creek, above the station at South Cairo, is Basic Creek, entering at Freehold. The reported high water mark on the dam at Freehold indicates a maximum freshet discharge for Basic Creek of 3,330 second-feet or 81 second-feet per square mile from the tributary drainage area of 41 square miles.

The gauging station is located at the highway bridge in the Village of South Cairo, and was established July, 1901. A 15-foot boxed weight gauge divided to feet and tenths was fastened to cross pieces on horizontal chords of the second section of bridge from the right bank, downstream side. The total span of the bridge is 194.5 feet between abutments, the faces of which are vertical. The stream-bed is of earth for twenty-five feet from the right-hand abutment. At this point a bluestone rock ledge outcrops, covered in patches with loose shingle and shifting gravel. The bench mark is on "O" near outer corner, upstream side of bridge seat, on right hand abutment.

Elevation of bench mark..........................	100.00
Elevation water surface when gauge reads zero.....	78.71
Center of highway 50 feet to left of end of bridge....	97.11

The entire flow of the stream at all stages passes under this bridge. High water marks observed at the bridge indicate a maximum elevation of the water surface of 96.2 feet, equivalent to a gauge reading 17.5 feet. The stage of the stream is observed each morning and evening by the gauge reader Mr. C. F. Abrams. The following table shows the result of discharge measurements which have been made. During extreme low water the current meter measurements are made by wading at a point 400 feet below the gauging station.

Table Showing Principal Developed Water Powers on Catskill Creek in 1901.

Number of dam.	LOCATION.	Name of mill and of owner or operator	Business or class of manufacture.	WORKING HEAD ON WATER WHEELS, IN FEET.			Water privileges at dam.	Rated power of water wheels at usual head, H. P.	H. P. of engines.	Remarks.
				Greatest.	Least.	Average.				
1	Leeds	Catskill Woolen Mill	Woolen and cotton fabrics	26	12	18	Entire	200	60	Mill not operated.
2	Leeds	Waterville Woolen Mill.	Woolen and cotton fabrics	19	4	14	Entire	200	80	Mill not operated.
3	Lake's Mills	Lake's Mills	Grist mill	....	....	....	Entire	....	....	
4	Woodstock	Woodstock Paper Mill	Paper mill	24	10	....	Entire	....	....	Mill abandoned.
1	Freehold	Brown's Mill	Grist mill	12	10	11	Entire	15–20	None.	Basic creek tributary, Catskill at Freehold.
2	Greenville	Reed's Mills	Grist mill	....	....	22	Entire	22	8	Basic creek tributary, Catskill at Freehold.
1	East Durham.	Not reported	Grist mill	....	....	16	Entire	....	....	Abandoned, Glenbrook stream.
2	East Durham.	Atter Bros	Saw and feed mill	30	....	....	Entire	30	....	Glenbrook stream.
3	East Durham	....	....	....	....	10	Entire	....	....	Abandoned, Glenbrook stream.

Daily Gauge Height of Catskill Creek at South Cairo. Greene County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	.....	.....	.....	.....	.....	.....	.....	2.55	2.92	2.8	2.7	2.65
2	.....	.....	.....	.....	.....	.....	.....	2.6	3.0	2.75	2.7	2.65
3	.....	.....	.....	.....	.....	.....	.....	2.55	3.22	2.7	2.65	2.65
4	.....	.....	.....	.....	.....	.....	2.75	2.4	3.27	2.7	2.67	3.3
5	.....	.....	.....	.....	.....	.....	2.9	2.4	3.05	2.67	2.67	3.3
6	.....	.....	.....	.....	.....	.....	3.3	2.5	2.92	2.67	2.65	3.32
7	.....	.....	.....	.....	.....	.....	3.6	3.35	2.87	2.62	2.7	3.32
8	.....	.....	.....	.....	.....	.....	3.63	3.05	2.9	2.65	2.7	3.3
9	.....	.....	.....	.....	.....	.....	3.35	2.88	2.87	2.6	2.65	3.35
10	.....	.....	.....	.....	.....	.....	3.08	2.8	2.82	2.65	2.65	5.35
11	.....	.....	.....	.....	.....	.....	3.53	2.77	2.8	2.6	2.65	4.62
12	.....	.....	.....	.....	.....	.....	3.45	2.65	2.75	2.6	2.68	4.45
13	.....	.....	.....	.....	.....	.....	3.23	2.55	2.77	2.65	2.8	3.95
14	.....	.....	.....	.....	.....	.....	3.0	2.5	2.72	2.8	3.02	6.95
15	.....	.....	.....	.....	.....	.....	2.85	2.5	2.7	3.1	2.85	12.8
16	.....	.....	.....	.....	.....	.....	2.9	2.5	2.75	3.15	2.82	5.6
17	.....	.....	.....	.....	.....	.....	3.85	2.4	2.82	3.02	2.77	5.0
18	.....	.....	.....	.....	.....	.....	3.78	2.52	2.97	2.97	2.75	4.4
19	.....	.....	.....	.....	.....	.....	4.35	2.62	2.97	2.9	2.75	4.0
20	.....	.....	.....	.....	.....	.....	3.58	2.68	2.82	2.85	2.75	3.85
21	.....	.....	.....	.....	.....	.....	3.18	2.75	2.8	2.82	2.75	3.9
22	.....	.....	.....	.....	.....	.....	2.68	3.05	2.8	2.8	2.75	4.0
23	.....	.....	.....	.....	.....	.....	2.95	3.22	2.77	2.8	2.7	4.0
24	.....	.....	.....	.....	.....	.....	3.0	3.45	2.72	2.8	2.7	4.07
25	.....	.....	.....	.....	.....	.....	3.02	3.55	2.67	2.8	2.7	3.45
26	.....	.....	.....	.....	.....	.....	2.82	3.2	2.65	2.8	2.7	3.4
27	.....	.....	.....	.....	.....	.....	2.7	2.95	2.65	2.75	2.65	3.4
28	.....	.....	.....	.....	.....	.....	2.7	2.8	2.7	2.75	2.65	3.5
29	.....	.....	.....	.....	.....	.....	2.72	2.7	2.8	2.75	2.65	3.85
30	.....	.....	.....	.....	.....	.....	2.65	2.65	2.82	2.7	2.65	4.5
31	.....	.....	.....	.....	.....	.....	2.6	2.6	.....	2.7	.....	4.4
1902.												
1	4.25	4.3	11.7	5.35	4.1	2.95	3.475	4.5	2.90	6.18	4.30	3.6
2	4.1	5.05	6.07	5.85	3.95	2.875	3.275	5.8	2.83	5.63	4.15	3.63
3	4.225	5.2	6.7	4.95	3.925	2.8	3.125	4.375	2.75	5.20	4.05	3.8
4	4.4	4.45	6.8	4.755	3.875	2.825	3.1	4.125	2.73	4.80	3.95	4.18
5	4.4	4.4	6.6	5.15	3.825	2.875	3.3	3.85	2.73	4.60	3.90	4.0
6	4.2	4.4	5.4	4.65	3.775	2.875	4.45	4.45	2.70	4.53	3.83	4.0
7	4.05	4.25	4.1	4.4	3.725	2.85	4.2	4.2	2.73	4.40	3.77	3.93
8	4.8	4.25	4.1	4.6	3.7	2.9	3.925	3.925	2.78	4.23	3.73	3.8
9	3.7	4.2	4.3	11.65	3.6	2.8	3.8	3.8	2.90	4.05	3.65	3.7
10	3.55	4.25	5.2	8.25	3.5	2.75	3.65	3.65	3.68	3.90	3.55	4.05
11	3.4	4.4	5.75	6.975	3.4	2.7	3.59	3.55	3.55	3.93	3.5	4.4
12	3.3	4.5	9.1	6.475	3.3	2.65	3.55	3.55	3.28	5.08	3.55	4.13
13	3.3	4.7	8.9	5.50	3.275	1.515	2.95	3.45	3.40	4.60	3.63	4.0
14	3.3	4.45	7.5	4.95	3.225	2.75	2.825	3.15	3.53	4.25	3.53	4.0
15	3.2	3.1	5.45	4.775	3.2	2.7	2.8	3.2	3.35	4.15	3.5	3.95
16	3.3	3.2	7.4	4.575	3.05	2.75	2.75	3.15	3.18	4.25	3.4	4.53
17	3.2	3.4	9.4	4.35	3.0	2.90	2.7	3.05	3.05	3.93	3.4	6.35
18	3.0	3.45	6.85	4.25	3.95	2.875	2.65	2.925	2.95	3.83	3.33	5.48
19	2.9	3.6	4.15	4.2	2.9	2.775	2.7	3.15	2.98	3.80	3.3	5.0
20	2.9	3.8	4.5	4.2	2.95	2.85	4.4	3.1	3.25	3.83	3.28	4.80
21	3.1	3.8	4.0	4.125	2.95	2.8	7.25	3.25	3.48	3.73	3.30	6.65
22	9.85	3.8	4.55	4.1	2.825	2.8	6.5	2.975	3.58	3.73	3.2	8.48
23	5.9	3.5	5.575	4.025	2.775	2.8	6.525	2.925	3.18	3.60	3.2	6.7
24	4.8	3.2	5.475	3.95	2.9	2.775	6.175	2.825	3.10	3.63	3.15	5.18
25	4.4	3.4	5.05	3.9	2.95	2.7	7.075	2.75	3.25	3.60	3.2	4.85
26	4.025	3.5	4.925	3.8	2.85	2.675	.....	2.7	3.58	3.50	3.3	6.65
27	3.85	4.825	4.825	3.825	3.1	2.65	4.05	2.7	4.35	3.55	3.85	4.35
28	3.575	9.15	5.15	3.725	3.325	2.6	4.2	2.725	[a]4.70	5.90	4.13	.....
29	3.7	.....	5.755	3.95	3.25	2.8	4.4	2.85	9.95	5.30	3.8	.....
30	4.25	.....	5.925	4.1	3.125	3.875	4.375	2.975	7.20	4.70	3.63	.....
31	4.3	.....	5.4	.....	3.0	.....	4.25	.....	.....	4.45	.....	.....

[a] 12 o'clock night 16.1.

Current Meter Discharge Measurements of Catskill Creek at South Cairo, Greene County, N. Y.

DATE.	Mean gauge height, feet.	Discharge, second-feet.	Hydrographer.
1901.			
October 10	2.58	23.3	Hollister and Schlecht.
October 4	2.70	25.6	W. W. Schlecht.
November 8	2.70	27.6	W. W. Schlecht.
August 19	2.70	39.6	Hollister and Place.
September 23	2.74	35.6	W. W. Schlecht.
November 9	2.75	42.3	W. W. Schlecht.
July 4	2.75	60.9	Horton and Hollister.
August 1	2.80	47.9	A. E. Place.
October 22	2.82	54.2	W. W. Schlecht.
September 7	2.92	68.8	A. E. Place.
August 9	3.00	81.5	A. E. Place.
July 25	3.00	81.9	A. E. Place.
September 2	3.00	87.0	A. E. Place.
August 27	3.12	121.4	A. E. Place.
July 17	3.50	260.3	Pressey and Place.
July 20	3.60	307.5	A. E. Place.
1902.			
June 13	2.69	40.6	W. W. Schlecht.
June 24	2.70	43.5	W. W. Schlecht.
August 27	2.74	39.4	H. K. Barrows.
September 5	2.79	50.0	H. K. Barrows.
June 3	2.82	49.5	W. W. Schlecht.
May 23	2.83	51.1	W. W. Schlecht.
September 22	3.32	121.0	P. M. Churchill.
July 9	3.365	113.5	H. K. Barrows.
May 10	3.47	133.0	W. W. Schlecht.
August 13	3.49	135.0	H. K. Barrows.
November 7	3.80	235.0	F. H. Tillinghast.
December 3	3.90	275.	F. H. Tillinghast.
October 10	3.92	242.0	P. M. Churchill.
April 22	4.06	320.2	W. W. Schlecht.
August 2	5.36	1005.0	H. K. Barrows.
December 18	5.45	1054.0	F. H. Tillinghast.
July 23	6.11	1602.0	H. K. Barrows.
April 11	6.86	2312.0	W. W. Schlecht.
March 13	8.66	5483.0	Horton and Schlecht.

A gauging station was made through ice 0.2 to 0.7 feet thick at a point 200 feet below the highway bridge by W. W. Schlecht, December 9, 1901.

Gauge height	3.30
Discharge, second-feet	109.5

A measurement made February 27, 1902, with the stream obstructed by ice, showed the discharge 363 second-feet, gauge height 4.72. The stream was frozen from bank to bank to a depth of 6 to 8 inches.

ESOPUS CREEK AT KINGSTON, ULSTER COUNTY, N. Y.

Esopus Creek has its source in Winnisook Lake on the northwestern slope of Slide Mountain, the highest peak of the Catskills.

From Big Indian to Olive Bridge, the stream flows through a deep valley, flanked on both sides by timber-covered mountains. Numerous sites for dams or storage reservoirs are offered at points where the valley broadens out for a short distance to receive the inflowing waters of tributaries. The most notable are at Big Indian, where Birch Creek enters; at the mouth of Bush Kill, at Shandaken; at the mouth of Stony Clove Creek, at Phoenicia; at Cold Brook, where Little Beaver Kill enters; and at Olive Bridge. The stream channel is relatively broad and shallow. The bed is covered with cobble and small boulders left behind after the erosion of drift deposits which formerly filled the valley. The descent of the stream is rapid though not precipitous until Olive Bridge is reached. At this point, the stream flows over a rock ledge in a narrow gorge forming Bishop's Falls. The natural fall is 22 feet and is increased to 28 feet by a timber dam on the crest of the ledge. This dam was originally constructed in 1828. High-water marks at Olive Bridge, just below the falls, indicate that the stream is subject to fluctuations of stage of 30 feet or more in a gorge 100 feet wide. Below Bishop's Falls the stream flows through a narrow gorge for some distance, after which the valley broadens out and the slopes become more gentle.

At Kingston the stream turns northward and flows parallel to Hudson River to Saugerties. A second notable water fall occurs at Glen Erie, where a short cascade occurs involving a fall of 56 feet. The final descent to tide water at Saugerties is made through a fall of 42 feet.

The gauging station was established at Washington Avenue Bridge in Kingston July 5, 1901. This bridge has a clear span of 116.6 feet between abutments, which are nearly vertical. In addition, there is on the left-hand side an overflow channel 19 feet in width. A boxed weight gauge, reading from zero to 15 feet, with the scale graduated to tenths of feet, was secured to the horizontal bridge chords on the upstream side near the left-hand end of the bridge. Gauge readings are taken each morning and evening. The observer is John Douglas. A circular chisel draft cut in the corner of the coping of the right-hand abutment forms the bench mark.

Elevation of bench mark........................	100.00
Elevation of water surface when gauge reads zero..	68.27

Owing to unfavorable conditions at the bridge, gaugings during extreme low water and during freshets are made, the former by wading at a point near the bridge, and the latter at the Ulster and Delaware Railroad Bridge, one-fourth mile upstream. The maximum stage of the stream corresponds to a gauge reading of nearly 25 feet. December 15, 1901, the stream attained a maximum gauge reading of 22.75 feet.

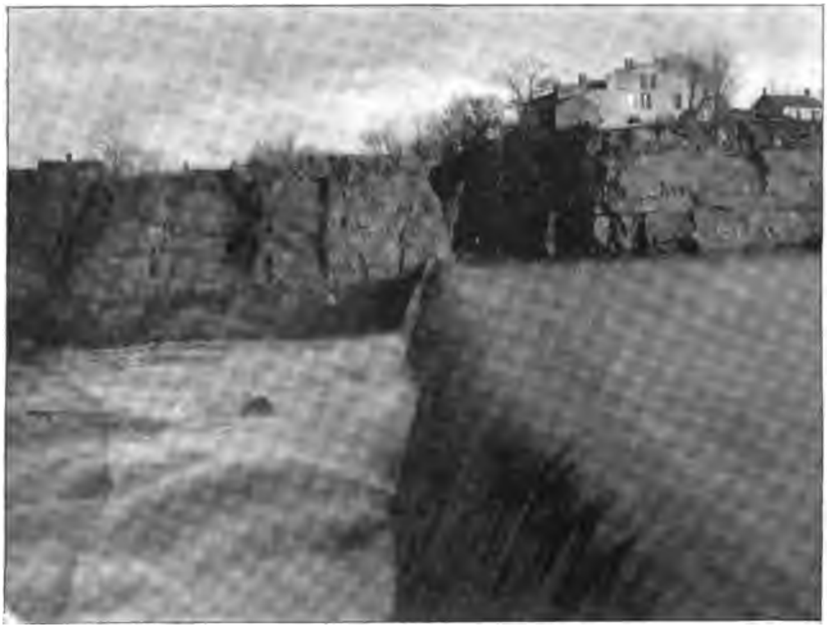
Current Meter Discharge Measurements of Esopus Creek at Kingston, Ulster County, N. Y.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1901.			
August 5	3.60	39.9	A. E. Place.
July 22	3.80	64.2	A. E. Place.
July 18	4.10	144.9	A. E. Place.
July 5	4.32	148.0	Horton and Hollister.
July 19	4.40	172.7	A. E. Place.
November 18	4.45	126.5	W. W. Schlecht.
September 26	4.55	167.8	W. W. Schlecht.
September 26	4.55	150.4	W. W. Schlecht.
August 19	4.60	180.2	Hollister and Place.
October 10	4.62	165.8	W. W. Schlecht.
October 10	4.62	188.1	George B. Hollister.
October 8	4.70	178.2	W. W. Schlecht.
November 1	4.74	184.3	W. W. Schlecht.
November 14	4.75	195.4	W. W. Schlecht.
September 21	4.78	200.3	W. W. Schlecht.
August 10	4.85	239.2	A. E. Place.
November 26	5.06	244.7	W. W. Schlecht.
October 3	5.26	329.4	W. W. Schlecht.
September 6	5.46	352.2	A. E. Place.
August 29	5.50	364.3	A. E. Place.
October 21	5.56	380.8	W. W. Schlecht.
August 8	5.65	396.1	A. E. Place.
September 4	6.11	554.3	A. E. Place.
August 27	6.26	728.6	A. E. Place.
October 16	6.64	785.2	W. W. Schlecht.
December 19	8.35	1,472.0	W. W. Schlecht.
December 11	11.46	1,720.8	W. W. Schlecht.[a]
December 30	12.15	3,989.0	W. W. Schlecht.
1902.			
June 16	4.48	135.8	W. W. Schlecht.
September 4	4.49	133	H. K. Barrows.
August 21	4.94	191	H. K. Barrows.
June 26	5.02	225	W. W. Schlecht.
June 5	5.03	234.5	W. W. Schlecht.
July 16	5.13	268.8	H. K. Barrows.
November 22	5.45	272	F. H. Tillinghast.
July 9	5.81	450.4	Barrows & Schlecht.
May 14	5.83	422	W. W. Schlecht.
September 23	5.87	449	P. M. Churchill.
November 11	6.00	416	F. H. Tillinghast.
August 12	6.28	550	H. K. Barrows.
May 24	6.38	[b]274	W. W. Schlecht.
June 5	6.41	[b]272	W. W. Schlecht.
November 5	6.55	594	F. H. Tillinghast.
April 23	6.94	828.3	W. W. Schlecht.
May 14	7.14	[b]508	W. W. Schlecht.
July 30	7.65	1,155	H. K. Barrows.
July 24	8.11	1,348	H. K. Barrows.
October 4	9.32	1,890	P. M. Churchill.
March 12	9.90	2,843	Horton & Schlecht.
April 30	10.28	2,813	W. W. Schlecht.
December 18	13.00	3,416	F. H. Tillinghast.
April 10	13.37	5,021	W. W. Schlecht.
December 22	16.00	8,594	F. H. Tillinghast.
March 1	20.38	[c]12,620	W. W. Schlecht.

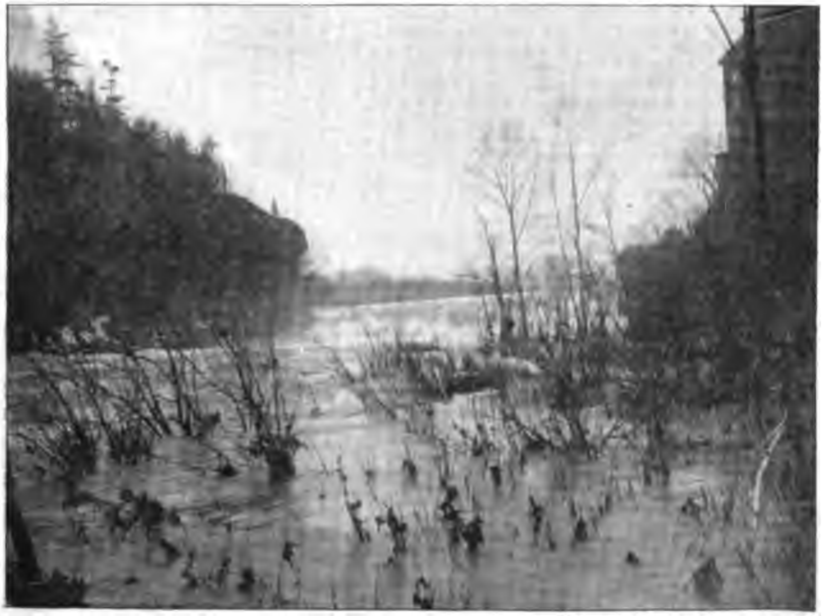
[a] Backwater from ice dam 300 yards down stream.

[b] Measured at Glasgow Bridge, Glen Erie.

[c] Large quantities of floating ice in the stream. Surface velocities used.



Esopus Creek: Dam at Saugerties, Ulster County, N. Y., 1902.



Esopus Creek, looking up stream to Saugerties dam, 1902.

The following measurements were also made during the period of ice obstruction by W. W. Schlecht.

February 20, 1902, gauge height 5.38, discharge 245 second-feet, river partly frozen over.

February 15, 1902, gauge height 5.60, discharge 337 second-feet, river mostly frozen over.

February 7, 1902, gauge height 6.83, discharge 530 second-feet, river partly frozen over.

September 29, 1902, 1.30 p. m., the stream attained a flood stage, giving a reading of 25.25 on the gauge.

Drainage Area of Esopus Creek.

LOCATION.	Square miles.
Above mouth at Saugerties	417
Above Glen Erie Falls	409
Above gauging station, Kingston	312
Above Bishop's Falls, Olive Bridge	234

A current meter measurement of Esopus Creek was made by E. G. Paul of Broadhead's Bridge, August 14, 1900. The discharge was 92 second-feet.

From a report of M. E. Evans, C. E., to the Saugerties Manufacturing Company in 1899, the following estimate of the mean flow of Esopus Creek at Saugerties during the several months of the driest year has been taken. The method of obtaining these results is not stated.

MONTH.	Flow in second-feet.	Flow in second-feet per square mile.
January	586	1.41
February	705	1.69
March	733	1.76
April	658	1.58
May	442	1.06
June	304	.73
July	98	.24
August	147	.35
September	152	.36
October	244	.58
November	456	1.09
December	489	1.17

Mr. Evans states that on December 10, 1878, occurred the highest known freshet in the stream. This resulted from a snowfall of six inches, followed by continuous excessive rains for three days, terminating in a downpour of unusual severity. The stream flowed in its highest stage 13 to 14.5 feet in depth over the crest of the dam, 330 feet in length, indicating a flood discharge of from 50,000 to 60,000 second-feet, or from 120 to 145 second-feet per square mile.

Water is diverted from Sawkill Creek, a tributary of Esopus Creek, for the supply of Kingston. Sawkill Creek has its source in Echo Lake, 2,060 feet above tide, and flows southeasterly, entering Esopus Creek four miles below the city of Kingston. Its channel is very precipitous and numerous waterfalls occur. Two reservoirs have been constructed, the lower one at an elevation of 350 feet above tide. The amount of diversion varies from 1.5 to 3 second-feet.

Gaugings of Sawkill Creek by the late William R. Hutton indicate the flashy and torrential character of the run-off from Esopus water-shed.[b] Mr. Hutton's measurements showed a minimum discharge of 1.5 second-feet at a point 1.5 miles above the mouth. In April, 1895, the melting of a twelve-inch fall of snow occasioned by warm winds and heavy rain, produced a flow of nearly 8,000 second-feet estimated discharge over the spillway of the lower reservoir. In 1896 it is estimated that a similar flood furnished over 8,000 second-feet. These extreme floods are of very short duration, the water remaining at its maximum stage not more than an hour or so. The drainage area above the point where the measurements were made is 35 square miles.

Estimated Extremes of Discharge of Sawkill Creek.

	DISCHARGE.	
	Second-feet.	Second-feet per square mile.
Minimum	1.25	.036
Maximum	8,000.	229.

Current Meter Discharge Measurements, Sawkill Creek, Four Miles Above Mouth.

DATE.	Discharge, second-feet.	Hydrographer.
September 30, 1901	53.5	W. W. Schlecht.
October 21, 1901	24	W. W. Schlecht.

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[b] Water Supply and Irrigation Paper, U. S. Geol. Survey, No. 35, pp. 61-62.

Principal Developed Water Powers on Esopus Creek in 1901.

Number of dam.	LOCATION.	Name of mill and of owner or operator.	Business or class of manufacture.	WORKING HEAD ON WATER WHEELS, IN FEET.			Water privilege at dam.	Rated power of water wheels at usual head, H. P.	H. P. of engines.	Remarks.
				Greatest.	Least.	Average.				
1	Saugerties.......	Diamond Paper Company, Sheffield estate........	Tissue paper	42	28	35	Leased.	607	425	Operated 24 hours per day.
2	Saugerties......	Saugerties Mfg. Company, Sheffield estate.	Blank books	23	14	21	Leased.	90	. ....	
3	Four miles above Saugerties.. ..	Legg's Mill....	Grist mill........ ...	...	....	... ..	.. .. ..	.... ..	.. ...	
4	Glen Erie..	Ulster White Lead Company	White lead	56	....	56	Entire...	....	None..	Idle since 1898.
5	Olive Bridge...	Boice Grist Mill.	Grist mill...	28	... .	22	½	....	None..	Right bank.
6	Olive Bridge....	DeWett's Mill, leased to Hudson River Pulp Company.	Saw mill	28	. ..	22	½	....	None..	Left bank, not operated.
7	Brown Station..	Hudson River Pulp Company	Pulp mill....	....	Good fall.	. ....	Entire...	......	.. ....	
8	Boiceville.. ...	J. C. Hornbeck.......	Excelsior..	10	8	9	Entire...	90	20	
9	Phœnicia. ...	Mrs. De Mott...	Excelsior..	......	. ...	6	Entire...	......	.. ....	
10	Big Indian.....	R. and T. C. Wey....	Saw mill.......... ...	.....	. ...	18	Entire...	60	None..	
11	Pine Hill*... .	George Rose Turning Mill..	Wood turning....	......	....	10	Entire...	...	None..	

*On Birch Creek.

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]												
1								[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2								[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3								[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4								[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9				..			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
10							4 25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13				....			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15						....	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20				.....		......	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21			.....				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23				......			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26				...			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27							3 625	4 [illegible]	4 5	4 [illegible]	4 [illegible]	4 35
28							3 [illegible]	3 [illegible]	4 725	4 45	4 [illegible]	[illegible]
29							3 [illegible]	3 [illegible]	4 45	4 [illegible]	5 45	[illegible] 55
30							4 2	3 45	4 525	4 [illegible]	4 [illegible]	[illegible] 65
31							4 25	5 225	.	4 6		9 45
1902												
1	6 2	7 25	20 1	9 25	8 25	4 [illegible]	6 [illegible]	7 [illegible]	4 45	13 35	7 [illegible]	5 9
2	6 75	7 45	20 [illegible]	9 [illegible]	8 [illegible]	4 [illegible]	6 [illegible]	7 35	4.46	11 [illegible]	6 [illegible]	5 7
3	[illegible]	9 25	[illegible]	9 [illegible]	7 775	4 75	6 175	7 325	4 443	10 [illegible]	5 [illegible]	6 19
4	8 4	7 72	[illegible]	7 [illegible]	7 7	4 825	6 6	6 9	4 32	9.50	6 55	6.43
5	7 [illegible]	7 52	9 15	7 425	7 425	4 7	6 [illegible]	5 525	4 [illegible]	9 60	6.55	6 33
6	7 2	7 15	8 [illegible]	7 [illegible]	7 [illegible]	4 725	6 [illegible]	7 [illegible]	4 33	9 64	6 25	6.18
7	6 [illegible]	6 725	7 9	7.[illegible]	6 [illegible]	4 [illegible]	6 [illegible]	6 [illegible]	4 [illegible]	8 [illegible]	6.[illegible]	6.35
8	6 [illegible]	6 40	7 [illegible]	7 275	6 73	4 [illegible]	6 [illegible]	6 425	4 35	8 [illegible]	6 35	6.6
9	6 [illegible]	6 3	8 [illegible]	14 1	6 56	4 [illegible]	5 9	6.4	4.38	7 55	6 13	6 45
10	6 4	6 [illegible]	9 2	[illegible]	6 4	4 [illegible]	5 575	5 [illegible]	7 [illegible]	7 40	6 [illegible]	6 [illegible]
11	6 [illegible]	6 [illegible]	9 [illegible]	[illegible]	6 225	4.[illegible]	5 5	5.[illegible]	6 00	7 15	7 [illegible]	6.35
12	6 [illegible]	6 [illegible]	9 [illegible]	10 425	6 1	4 45	5.[illegible]	6 [illegible]	5 49	9.10	5.96	6.55
13	6 [illegible]	6 [illegible]	11 [illegible]	9 [illegible]	5 [illegible]	4 725	5 325	5 725	5 53	8 47	5 85	6.35
14	6 [illegible]	6 6	11 [illegible]	8 [illegible]	5 875	4 [illegible]	5 5	5.[illegible]	6 18	8 00	5 78	6 4
15	6 6	[illegible]	9 [illegible]	8 [illegible]	5 7	4 40	5 2	5 [illegible]	5 85	7.60	5 73	6 43
16	6 [illegible]	6 [illegible]	9 [illegible]	7 [illegible]	5 7	4 46	5.325	5 30	5 53	7 33	5.63	6 65
17	6 [illegible]	6 [illegible]	[illegible] a	7.[illegible]	5 5	4 775	4.[illegible]	5 [illegible]	5 50	7 15	5 60	16.20
18	6 3	6 [illegible]	12 1	7 [illegible]	5 225	4 93	4 8	5 325	5.13	6.95	5.6	12 86
19	6 [illegible]	6.45	10 125	7 1	5.[illegible]	4.625	4 775	4.975	5 08	6.75	5 54	11 00
20	6 [illegible]	6 3	9 2	6 925	5 40	4 60	6 375	4 975	5.30	6 73	5.46	9.95
21	4 [illegible]	6 35	8 61	6 8	5 275	4 81	10.0	4.875	6 88	6.47	5.45	8.55
22	12 [illegible]	5 25	8 25	6 [illegible]	5 125	5 55	9 5	4 85	6 28	6.30	5.38	15.6
23	10 [illegible]	6 3	7 975	6 [illegible]	5 025	5.[illegible]	9.275	4.775	5 88	6.20	5 36	12.80
24	8 [illegible]	6 35	7 90	6 875	5 0	4 925	8.6	4 335	5 68	6 13	5 36	10 40
25	13 0	6 20	7 625	6 [illegible]	4.875	4 81	8 575	4.435	5.68	6 30	5.2	9 35
26	7 [illegible]	6 45	7 4 5	6 [illegible]	5 20	4 925	8 675	4 65	7 00	5 87	5.3	8.7
27	8 625	9 3	7 275	6.[illegible]	5 2	5.375	8 125	4.55	10.35	5 78	6.0	8.28
28	8 [illegible]	9 30	7 18	6 2	5.575	4.83	7.75	4.385	9 48	7.83	6 6	... ...
29	7 [illegible]		11 66	5 975	5 25	4.81	7 19	4 70	[b]22.43	8 35	6.1	.... ..
30	7 61		12 55	9 81	5 0.5	7.1	7 675	4.6	17.85	7 75	5.88	......
31	7 175		10 45.	... ...	5 025	. ..	7.35	... ...	. ....	7.50	.....	....

a Highest water, 18.30. b Highest water at 1.30 p. m., 25.25.

RONDOUT CREEK AT ROSENDALE, ULSTER COUNTY, N. Y.

Rondout Creek has its source in the heart of the timber-covered mountain group forming Wittemberg Chain. It flows southeasterly to Napanoch, where it encounters the foot of Shawangunk Range, turns abruptly to the northeast and enters the Hudson River at Rondout. Its watershed on the south is very restricted, as it is separated from the Wallkill River only by the narrow Shawangunk Ridge. Notable waterfalls occur at Honk Falls and Napanoch over Hudson River shale, and on Good Beer Kill above Ellenville. On Good Beer Kill there is a total fall of 870 feet from the Cape, three miles above Ellenville to Ellenville. Of this about 200 feet are concentrated in a series of cascades called Hanging Rock Falls.

Water power was originally developed at Napanoch in 1754. At present there are five dams in this village, utilizing a total of 115 feet fall. A series of cascades, involving a descent of about 50 feet, occurs at High Falls, where the water flows over Rosendale cement rock.

The gauging station was established at the highway bridge in Rosendale, three miles above the junction with the Wallkill, July 6, 1901. Readings of the river stage are taken each morning and evening by A. E. Huben. A 15-foot decimal scale in a wooden box, with weight and wire for observing the gauge height, is supported by outriggers fastened to the chords and floor-beams near the center of the downstream side of the bridge. The bridge has a single span of 136 feet. The bed of the channel is rock and the entire flow, aside from diversion to the Delaware and Hudson Canal, described elsewhere, passes under the bridge at all stages. The current is sluggish during extreme low water. Gaugings of low stages of the stream are made by wading at a ford one mile downstream. The bench mark is an "0" cut in the upstream corner of the bridge seat right-hand abutment.

Elevation bench mark...........................	100.00
Elevation water surface when gauge read zero....	67.97

Drainage Areas of Rondout Creek.

LOCATION.	Square miles.
Above Honk Falls	88
Above High Falls	339
Above Gauging Station, Rosendale	365
Above Junction with Walkill River	369
Below Junction with Walkill River	1,148
Above mouth at Rondout	1,164

Current Meter Discharge Measurements of Rondout Creek at Rosendale, Ulster County, N. Y.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1901.			
July 18	6.30	118.2	A. E. Place.
August 6	6.40	99.4	A. E. Place.
November 7	6.42	138.2	W. W. Schlecht.
September 24	6.45	139.6	W. W. Schlecht.
October 11	6.47	163.2	W. W. Schlecht.
October 11	6.47	201.8	G. B Hollister.
November 16	6.55	183.0	W. W. Schlecht.
July 6	6.55	319.0	Horton and Hollister.
August 15	6.55	225.4	A. E. Place.
October 7	6.60	217.5	W. W. Schlecht.
September 7	6.90	426.7	A. E. Place.
August 20	6.94	526.4	Hollister and Place.
October 18	7.03	509.9	W. W. Schlecht.
August 28	7.15	644.6	A. E. Place.
August 8	7.50	745.4	A. E. Place.
September 4	7.56	836.1	A. E. Place.
December 21	7.60	772.0	W. W. Shlecht.[a]
September 3	7.80	1,200.0	A. E. Place.
December 12	8.00	1,490.8	W. W. Schlecht.
November 26	7.21	675.4	W. W. Schlecht.
December 30	11,95	5,353 0	W. W. Schlecht.[a]
1902.			
September 25	6.31	167	P. M. Churchill.
July 15	6.33	141.9	H. K. Barrows.
July 18	6.33	137.2	H. K. Barrows.
August 29	6.33	145	H. K. Barrows.
June 6	6.38	163	W. W. Schlecht.
June 20	6.42	166	W. W. Schlecht.
November 21	6.55	283.4	F. H. Tillinghast.
December 2	6.70	367	F. H. Tillinghast.
April 28	6.83	382	W. W. Schlecht.
May 12	6.855	421	W. W. Schlecht.
November 4	7.00	570	F. H. Tillinghast.
August 7	7.39	838	H. K. Barrows.
July 29	7.40	888	H. K. Barrows.
March 21	8.07	1,529	W. W. Schlecht.
March 1	17.60	13,936	W. W. Schlecht.
April 11	11.78	5,665	W. W. Schlecht.
December 17	12.8	7,928	F. H. Tillinghast.

[a] Stream somewhat obstructed by shore ice.

Additional measurements were made by W. W. Schlecht while the river was frozen over as follows:

February 18, 1902, gauge height 7.70, discharge 342 second-feet. The river was frozen over from bank to bank and slush had collected below the ice.

February 26, 1902, gauge height 8.13, discharge 543 second-feet; slush below the ice made an unsatisfactory record.

February 26, 1902, gauge height 8.43, discharge 684 second-feet; ice covered the river from bank to bank and slush had collected underneath.

Daily Gauge Height of Rondout Creek at Rosendale, Ulster County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	.....	.....	.....	.....	.....	.....	.....	7.57½	7.62½	7.26½	6.5	6.55
2	.....	.....	.....	.....	.....	.....	.....	5.5	7.95	6.85	6.5	6.4
3	.....	.....	.....	.....	.....	.....	.....	6.3	7.8	6.95	6.5	6.5
4	.....	.....	.....	.....	.....	.....	.....	6.25	7.61½	6.8	6.45	6.85
5	.....	.....	.....	.....	.....	.....	.....	6.17½	7.42½	6.7	6.4	6.87
6	.....	.....	.....	.....	.....	.....	.....	6.35	6.97½	6.62½	6.4	6.85
7	.....	.....	.....	.....	.....	.....	.....	9.75½	6.87½	6.55	6.4	6.92
8	.....	.....	.....	.....	.....	.....	6.5	7.35	6.77½	6.55	6.4	7.0
9	.....	.....	.....	.....	.....	.....	6.4	6.92½	6.67½	6.52½	6.4	7.2
10	.....	.....	.....	.....	.....	.....	6.25	6.62½	6.6	6.45	6.4	9.2
11	.....	.....	.....	.....	.....	.....	6.2	7.17½	6.6	6.42½	6.37	9.25
12	.....	.....	.....	.....	.....	.....	6.25	7.42½	6.65	6.42½	6.45	8.22
13	.....	.....	.....	.....	.....	.....	6.3	6.87¾	6.72½	6.5	6.95	7.75
14	.....	.....	.....	.....	.....	.....	6.33	6.55	6.57½	7.25	6.8	8.97
15	.....	.....	.....	.....	.....	.....	6.3	6.50	6.5	7.72½	6.62	16.75
16	.....	.....	.....	.....	.....	.....	6.38	6.52½	6.62½	7.37½	6.6	10.6
17	.....	.....	.....	.....	.....	.....	6.3	6.5	6.67½	7.1	6.55	8.95
18	.....	.....	.....	.....	.....	.....	6.85	6.75½	7.05	7.0	6.55	8.4
19	.....	.....	.....	.....	.....	.....	6.55	7.	6.85	6.9	6.55	7.77
20	.....	.....	.....	.....	.....	.....	6.48	6.95	6.65	6.8	6.5	7.55
21	.....	.....	.....	.....	.....	.....	6.47½	8.75	6.55	6.72½	6.4	7.55
22	.....	.....	.....	.....	.....	.....	6.37½	8.15	6.52½	6.7	6.35	7.57
23	.....	.....	.....	.....	.....	.....	6.4	7.5	6.47½	6.7	6.4	7.95
24	.....	.....	.....	.....	.....	.....	6.35	9.0	6.42½	6.6	6.5	7.75
25	.....	.....	.....	.....	.....	.....	6.35	9.4	6.4	6.6	7.6	7.22
26	.....	.....	.....	.....	.....	.....	6.3	8.1	6.35	6.6	7.25	7.12
27	.....	.....	.....	.....	.....	.....	6.47½	7.47½	6.32½	6.6	6.97	7.0
28	.....	.....	.....	.....	.....	.....	6.42½	7.15	6.3	6.65	6.87	7.35
29	.....	.....	.....	.....	.....	.....	6.37½	6.95	7.05	6.5	6.8	9.1
30	.....	.....	.....	.....	.....	.....	6.67½	7.42½	7.41½	6.5	6.8	12.12
31	.....	.....	.....	.....	.....	.....	6.72½	6.72½	.....	6.5	.....	10.0
1902.												
1	8.725	8.975	17.2	8.175	8.25	6.575	7.075	7.70	6.25	10.03	7.25	6.73
2	7.9	8.95	14.225	7.85	7.7	6.475	6.90	8.35	6.20	9.28	7.05	6.7
3	7.9	9.75	11.93	7.575	7.7	6.55	6.975	7.6	6.13	8.43	7.03	6.9
4	7.9	9.35	9.75	7.575	7.75	6.625	7.7	7.275	6.15	7.90	7.00	7.2
5	7.9	9.7	8.7	7.35	7.5	6.475	7.225	7.075	6.10	7.80	6.90	6.88
6	7.825	9.25	8.05	7.25	7.325	6.40	7.125	7.25	6.18	8.78	6.87	6.8
7	7.575	9.0	7.95	7.6	7.275	6.475	7.0	7.325	6.20	8.00	6.95	6.95
8	7.275	8.825	7.65	8.1	7.15	6.45	6.875	7.025	6.20	7.65	6.85	6.98
9	7.125	8.575	9.9	12.25	7.025	6.475	6.85	6.925	6.23	7.38	6.8	6.88
10	7.075	8.05	9.7	11.4	6.925	6.375	6.675	6.825	7.00	7.18	6.78	7.1
11	7.1	8.175	9.3	9.75	6.875	6.3	6.575	6.8	6.58	6.95	6.73	7.08
12	7.35	8.05	9.7	9.15	6.875	6.35	6.525	6.9	6.40	9.75	6.73	7.0
13	6.95	7.925	11.05	8.475	6.825	6.35	6.5	6.8	6.45	8.65	6.73	6.95
14	6.725	7.875	10.15	8.15	6.675	6.375	6.45	6.70	6.68	8.00	6.7	7.15
15	6.825	7.8	9.15	7.85	6.625	6.35	6.35	6.55	6.48	7.57	6.7	7.5
16	6.9	7.65	8.8	7.65	6.7	6.35	6.4	6.575	6.35	7.35	6.7	8.35
17	6.775	7.525	13.1	7.5	6.6	6.5	6.325	6.5	6.25	7.23	6.65	12.95
18	6.7	7.6	9.95	7.375	6.625	6.45	6.3	6.45	6.20	7.07	6.65	10.0
19	6.775	7.35	8.65	7.25	6.6	6.3	6.325	6.4	6.18	7.07	6.68	8.80
20	6.7	7.425	8.25	7.175	6.60	6.425	7.525	6.4	6.25	7.00	6.65	8.3
21	6.725	7.425	8.075	7.1	6.575	6.425	8.875	6.375	6.50	6.95	6.65	8.35
22	14,675	7.4	8.0	7.05	6.5	7.1	9.175	6.475	6.40	6.90	6.65	13.45
23	9.825	7.425	7.875	7.0	6.475	6.70	8.375	6.40	6.23	6.80	6.6	10.58
24	8.35	7.475	7.8	6.9	6.45	6.5	9.75a	6.4	6.25	6.80	6.6	9.55
25	7.85	7.55	7.625	6.875	6.4	6.4	10.25	6.325	6.45	6.80	6.55	8.5
26	7.675	8.725	7.45	7.475	6.8	6.425	8.95	6.3	9.40	6.73	6.7	8.1
27	8.95	10.675	7.375	6.95	6.875	6.5	8.225	6.275	9.75	6.63	6.75	8.87
28	7.75	12.1	7.325	6.825	7.2	6.425	7.8	6.25	8.68	9.38	6.90	.....
29	8.0	.....	9.85	6.775	6.85	6.45	7.375	6.325	14.9b	8.60	6.88	.....
30	8.175	.....	9.525	9.375	6.60	7.7	7.80	6.3	10.78	7.83	6.8	.....
31	8.6	.....	8.625	.....	6.625	.....	7.325	.....	.....	7.45	.....	.....

a Highest water, 12.65, at 7 p. m. *b* Highest water, 15.6 at 3 p. m.

DIVERSION FROM RONDOUT CREEK TO FEED DELAWARE AND HUDSON CANAL.

The Delaware and Hudson Canal utilizes slackwater from the mouth of Rondout Creek to Eddyville. From the head of the pond above Eddyville dam the canal runs parallel to Rondout River as far as Napanoch. From Napanoch to Summitville it follows the valley of Sandberg Creek, tributary to Rondout River at Napanoch. Numerous dams on Sandberg Creek, also dams on Rondout Creek at Port Hickson and High Falls, formerly supplied the canal with water from its Summitville level to Hudson River tide water. The Delaware and Hudson Canal was originally constructed in 1850. In 1898 it was abandoned from Honesdale, Pa., to Ellenville, N. Y. August 1, 1901, the remaining canal, with the exception of that from High Falls feeder to Rondout, was abandoned. The gauging station on Rondout Creek at Rosendale is situated opposite the canal level between locks 6 and 7. The water supply is entirely drawn from the dam and feeder on Rondout Creek below High Falls. A current meter measurement of the flow in the feeder September 19, 1901, showed the diversion from Rondout Creek to be 28 second-feet at the dam. A measurement of the outflow from the Rosendale level showed the flow in the canal past the gauging station to be 10 second-feet, the remainder of the diverted water having been returned over three intervening waste-weirs.

The presence of the canal parallel with the river probably increases the loss from surface evaporation on Rondout Creek to some extent. The canal follows the left-hand bank of Rondout Creek and intercepts some inflow from drainage on that side. All water diverted from Rondout Creek at High Falls feeder, with the exception of evaporation losses, is returned to the stream before it reaches Rondout. A part of this water is carried past the gauging station at Rosendale. In order to determine the amount of this diversion during the season of canal navigation, usually from April 1st to December 10th.

a record has been kept at Lock 6 or Creek Locks, at the lower end of the Rosendale level. The record includes:

(1) Overflow of by-pass weir.

(2) Water used for lockage.

(3) Flow through paddles in mitre gates.

There is also a small amount of leakage of the lock walls and gates which has not been estimated. The flow in the canal at Lock 6, added to the flow at the Rosendale gauging station, will give the total actual run-off from Rondout Creek watershed above Rosendale. A record at Lock 6 has been kept since October 1, 1901, showing the mean monthly diversion as follows:

October, 1901 .... 20 second-feet.
November, 1901 .... 19 second-feet

Estimated Diversion from Rondout Creek to Delaware and Hudson Canal, Rosendale, Ulster Co., N. Y., in Second-feet, for 1902.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	15.5	22.6	.....	24.2	26.0	.....	22.6	22.5	24.5
2	.....	.....	.....	17.7	15.0	25.2	23.8	25.6	25.3	22.4	.....	20.8
3	.....	.....	.....	21.5	24.6	20.8	23.1	.....	22.5	26.1	21.0	22.3
4	.....	.....	.....	22.0	.....	11.6	.....	23.8	24.3	25.8	23.5	21.5
5	.....	.....	.....	17.9	27.6	25.3	24.1	24.5	25.3	.....	21.5	22.7
6	.....	.....	.....	.....	23.1	19.5	.....	22.5	25.8	22.2	23.3	19.0
7	.....	.....	.....	20.4	24.8	21.8	23.1	24.5	.....	23.1	24.2	*a*
8	.....	.....	.....	20.2	24.3	.....	22.7	23.8	25.0	22.4	24.8	.....
9	.....	.....	.....	18.4	24.6	23 8	24.3	24.0	23.5	21.9	.....	.....
10	.....	.....	.....	14.3	24.5	35.9	25.3	.....	24.3	22.8	22.8	.....
11	.....	.....	.....	20.7	.....	24.9	26.1	24.0	24.3	22.1	21.7	.....
12	.....	.....	.....	19.2	24 3	33.8	21.8	24.5	25.1	.....	.....	.....
13	.....	.....	.....	.....	24.1	27.5	.....	24.6	22.2	20.4	21.2	.....
14	.....	.....	.....	25.4	25.0	23.6	25.3	26.0	.....	20.6	23.0	.....
15	.....	.....	.....	25.7	24.1	.....	25.3	24.8	26.5	20.5	23.3	.....
16	.....	.....	.....	24.2	24.5	22.3	24.2	24.5	25.6	19.5	.....	.....
17	.....	.....	.....	25.1	22.8	22.6	26.0	.....	25.8	19.5	21.6	.....
18	.....	.....	.....	26.1	.....	24.3	25.1	25.5	23.3	19.7	24.8	.....
19	.....	.....	.....	25.6	24.3	23.8	22.7	24.3	24.8	.....	23.8	.....
20	.....	.....	.....	.....	24.6	23.9	.....	23.8	22.0	21.3	20.5	.....
21	.....	.....	.....	25.9	23.1	24.4	23.8	25.1	.....	23.5	26.0	.....
22	.....	.....	.....	26.7	23.6	.....	25.6	25.6	24.3	21.0	21.8	.....
23	.....	.....	15.8	24.1	25.6	22.1	22.8	24.3	23.8	21.2	.....	.....
24	.....	.....	11 4	23.3	24.3	20.8	20.6	.....	24.0	23.0	23.0	.....
25	.....	.....	12.3	23.4	.....	22.6	19.0	22.8	25.1	20.4	21.2	.....
26	.....	.....	15.3	22.8	21.1	22.8	22.8	22.2	22.8	.....	20.7	.....
27	.....	.....	16.9	.....	28.0	19.8	.....	25.1	22.6	22.8	22.7	.....
28	.....	.....	16.4	27.1	26.5	22.6	25.6	22.6	.....	23.8	24.8	.....
29	.....	.....	.....	25.2	26.3	.....	21.6	25.8	20.3	24.3	22.5	.....
30	.....	.....	.....	25.8	20.1	26.7	23.6	23.0	22.1	23.0	.....	.....
31	.....	.....	21.8	.....	24.1	.....	26.4	.....	.....	25.0	.....	.....
Mean	.....	.....	.....	22.5	24.0	23.7	23.8	24.3	24.0	22.2	18.2	.....

a Close of navigation.

MEAN MONTHLY DIVERSION IN SECOND-FEET TO DELAWARE AND HUDSON CANAL, LOCK No. 6, NEAR ROSENDALE.

1902. Month.	Second-feet.
March 23rd to 31st inclusive	15.7
April	22.45
May	24.00
June	23.67
July	23.78
August	24.33
September	23.99
October	22.23

RONDOUT CREEK AT HONK FALLS, ULSTER COUNTY, N. Y.

Rondout Creek above its junction with Sandberg Creek at Napanoch (also called Lackawack Creek), is essentially a mountain stream. At Honk Falls a natural declivity affords a fall of 125 feet over tilted strata of Hudson River shale. This fall has been increased to 147.5 feet by the construction of a masonry dam at the head of the gorge.

Water to feed the turbines is carried to the power house, one-fourth mile below the dam, in a circular steel penstock. The turbines are a special design of the Victor type. The outflow from the turbines passes over a tailrace weir below the power house. All water flowing in the stream passes over either the spillway of the dam or over the tailrace weir. The dam is of concrete masonry. It has an Ogee shaped cross section and a level spillway 186.6 feet in length.

Arrangements have been made for maintaining a record at this plant. A Bristol recording gauge has been placed above the dam, arranged to keep a continuous record of the discharge over the dam; a record of the amount of water used by the turbines is also kept by a similar automatic gauge in the tailrace. The maximum observed discharge of Rondout Creek at Honk Falls has been 8,650 second-feet or 98.1 second-feet per square mile from the tributary drainage area of 88 square miles.

The power is used for the generation of electricity, which is transmitted to Ellenville, a distance of three miles.

Principal Developed Water Powers on Rondout Creek, Ulster County, in 1901.

Number of dam.	LOCATION.	Name of mill and of owner or operator.	Business or class of manufacture.	WORKING HEAD ON WATER WHEELS, IN FEET.			Water privilege at dam.	Rated power of water wheels at usual head, H. P.	H. P. of engines.	Remarks.
				Greatest.	Least.	Average.				
1	Eddyville	D. and H. Canal Company	Slack water navigation				Entire	None	None	
2	Lawrenceville	Lawrenceville Cement Company	Natural cement			10	Entire			Power not used.
3	Below High Falls	W. I. Vandermark, J. H. Vandermark estate	Natural cement and canal feeder	14	10			80	125	Dam also feeds D. and H. canal.
4	High Falls	Hasbrook & Hopper, Ulster County Savings Banks	Flour mill			12	Entire			
5	High Falls		Abandoned			31	Entire			Abandoned.
6	Port Hickson	D. and H. Canal	Canal feeder			10	Entire			Abandoned.
7	Napanoch	E. C. Shook & Son	Flour mill			6	Entire	60	None	Upper Rondout or Lackawack Co.
8	Napanoch	M. M. Pillsbury	Grind shop			7	Entire			
9	Napanoch, R. H.	Humphrey & Young	Paper mill			30	½	481		
10	Napanoch, L. H.	J. C. & S. E. D. Hornbeck	Paper mill			30	½			
11	Napanoch	Pittsburg Ax Factory	Edge tools							
12	Napanoch, L. H.	Napanoch Knife Company	Edge tools			15½		12	None	
13	Napanoch, L. H.									Abandoned privilege.
14	Napanoch, R. H.	Young & Humphrey, John Russell estate	Barking knife works				½			
15	Napanoch, L. H.	M. M. Pillsbury Paper Mill	Toilet tissue paper			56	½	593		
16	Napanoch	Honk Falls Power Company	Generator of electricity			147.5	Entire	1,500	None	
17	Lackawack	C. N. Morse	Excelsior	11		10	Entire	140	None	
18	Grahamville		Sawmill							
19	Bull River		Two sawmills					50-100		

WALLKILL RIVER AT NEW PALTZ, ULSTER COUNTY, N. Y.

Wallkill or New Paltz River has its source in Sparta Mountain, New Jersey, about twenty-one miles from the point where it enters New York State.[a] From its source to the head of the Drowned Lands it is essentially a highland stream. Mr. Vermeule states that high-water marks on Clove River, one of the tributaries of Wallkill River in this region, indicate a maximum discharge of 67 second-feet from a drainage area of 0.7 square mile, or at the rate of 96 second-feet per square mile.

The Drowned Lands are an extensive Pleistocene lake bottom situated mainly in New York. They comprise an area of 28 square miles. A dam of drift at the north end of this tract holds back the water of the Wallkill, causing an overflowing of this entire flood plain. Until about 55 years ago, this area formed a shallow lake or undrained swamp. An artificial canal cut through the drift at the foot has enabled a large part of the downstream portion to be reclaimed for agricultural purposes.

Below the foot of the Drowned Lands, 15 miles from the New Jersey line, the Wallkill flows in a broad, shallow valley, averaging perhaps one-half mile in width. This valley has been eroded from the drift, leaving a stream-bed of cobble and small boulders too heavy for stream transport. The river terraces are not abrupt, often curving gracefully to the uplands 30 to 60 feet above the stream, and leaving a narrow flood plain submerged only during freshets. At frequent intervals the stream cuts through the overlying drift to the Hudson River slate, and passing over ledges of this slate produces waterfalls.[b]

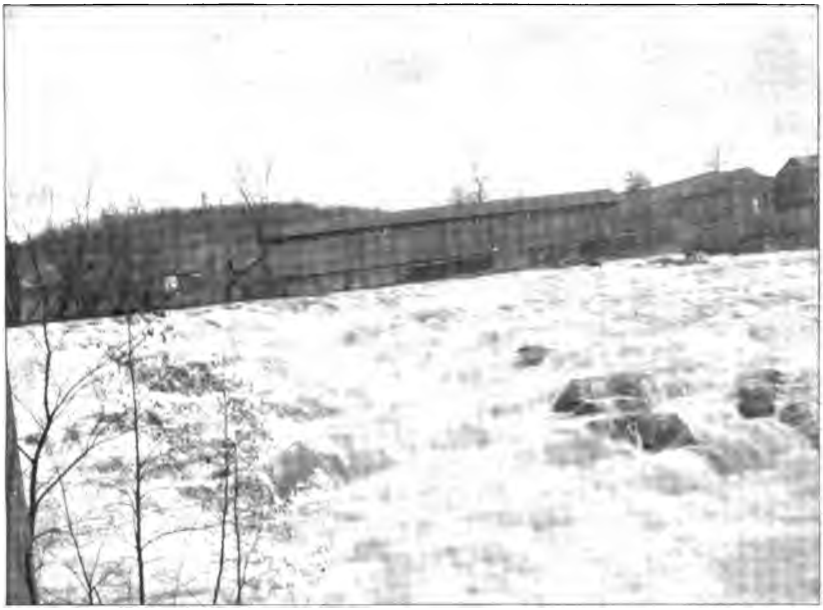
Much of the fall of the stream is concentrated in a number of such cascades having natural declivities as follows:

LOCATION.	Approximate fall, in feet.
Montgomery	9
Walden	26
Wallkill	10
Dashville	42
Rifton Glen	21

---

[a] The Wallkill in New Jersey is described in Geological Survey, New Jersey, Vol. 3, Water Supply, by C. C. Vermeule, pp. 147-150 see also The Wallkill, Appendix No. 14, pp. 516-530, Report on New York's Water Supply, by John R. Freeman.

[b] The Geology of Orange County, N. Y., by Heinrich Ries, Ph. D. New York State Museum Report. 1895, Part 2, pp. 395-475.



Kaaterskill Falls, near Catskill, Greene County, N. Y., 1902.

Wallkill River: Dam at Wallkill, Ulster County, N. Y., 1902.

The draining of the Drowned Lands is believed to have affected the summer flow of the stream in some degree.

At Gardiner, the Wallkill receives its principal tributary, the Shawangunk Kill. The divide between the two streams is formed by vertical strata of a blue shale fold, making a very definite ridge between the drainage basins.

The gauging station is situated in a drift filled valley at New Paltz highway bridge. The station was established July 7, 1901. Readings of the river stage are taken twice daily by the observer, C. E. Brach. The gauge consists of a 15-foot boxed scale graduated decimally, attached horizontally to the tie rods on the downstream side near the left-hand end of the bridge. The bridge has a span of 146.6 feet between the vertical faces of the masonry abutments. The entire flow passes under this bridge except during extreme freshets, when a flood plain on the left-hand bank is over-flowed. At such time discharge measurements can be made at the Wallkill Valley Railroad bridge three miles downstream, where the entire flow is confined to the stream channel at all stages.

The bench mark is a circular chisel draft in the coping on the capstone forming the bridge seat on the right-hand abutment.

Elevation bench mark	100.00
Elevation water surface when gauge reads zero	70.96

Current Meter Measurements of Wallkill River at New Paltz, Ulster County, N. Y.

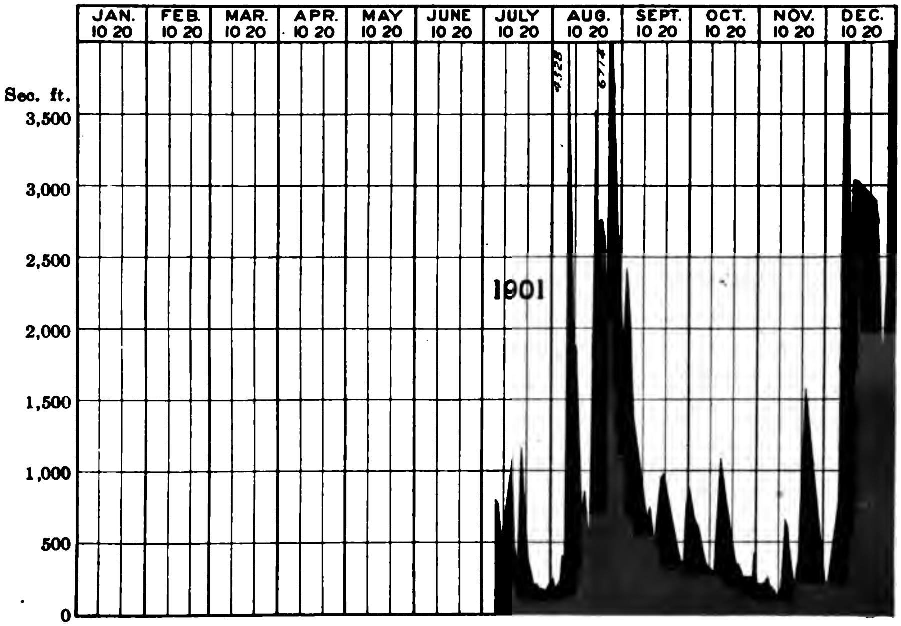
DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1901.			
November 9	5.94	178	W. W. Schlecht.
July 23	6.20	306	A. E. Place.
October 11	6.30	340	W. W. Schlecht.
October 11	6.30	355	George B. Hollister.
October 24	6.33	333	W. W. Schlecht.
October 9	6.48	398	W. W. Schlecht.
November 16	6.50	402	W. W. Schlecht.
July 7	7.19	824	Horton and Hollister.
July 8	7.25	842	Horton and Hollister.
October 1	7.36	896	W. W. Schlecht.
November 27	7.52	1,022	W. W. Schlecht.
September 19	7.73	1,076	Horton, Place and Schlecht.
August 13	7.85	1,038	A. E. Place.
July 19	8.23	1,243	A. E. Place.
September 5	8.90	1,676	A. E. Place.
August 31	9.07	1,917	A. E. Place.
August 20	10.00	2,729	Hollister and Place.
August 28	10.60	2,982	A. E. Place.
December 11	11.50	3,040	W. W. Schlecht. *a*
December 19	13.70	3,277	W. W. Schlecht. *a*
August 7	14.85	7,365	A. E. Place.
1902.			
July 17	5.70	124.3	H. K. Barrows.
August 28	5.86	169	H. K. Barrows.
September 18	5.96	209.5	H. K. Barrows and Churchill
June 19	6.18	295	W. W. Schlecht.
May 21	6.33	344	W. W. Schlecht.
June 6	6.40	381	W. W. Schlecht.
November 18	6.62	550	F. H. Tillinghast.
May 13	6.68	506	W. W. Schlecht.
August 15	6.72	518	H. K. Barrows.
Dec. 2	6.8	626	F. H. Tillinghast.
April 26	6.92	680	W. W. Schlecht.
February 24	7.33	*b* 288	W. W. Schlecht.
July 29	7.49	942	H. K. Barrows.
April 21	7.57	1,028	W. W. Schlecht.
February 10	7.78	*c* 597	W. W. Schlecht.
November 4	7.95	1,165	F. H. Tillinghast.
August 6	7.98	1,150	H. K. Barrows.
May 1	10.264	2,623	W. W. Schlecht.
April 9	13.21	5,354	W. W. Schlecht.
March 11	15.93	7,140	W. W. Schlecht.

December 30, 1901, the river obtained a maximum stage of 20.5 feet.

Drainage Areas of Wallkill River.

LOCATION.	Square miles.
Wallkill River above Franklin Furnace, New Jersey	31
Wallkill River at New York and New Jersey State line	210
Wallkill River above foot of Drowned Lands	393
Wallkill River above Freeman's proposed dam site	464
Wallkill River, mouth Shawangunk Kill	563
Shawangunk Kill above mouth	149
Wallkill River below mouth, Shawangunk Kill	712
Wallkill River above gauging station at New Paltz	736
Wallkill River above Rifton Glen	761
Wallkill River junction with Rondout Creek	779
Wallkill River total drainage in New York	567

a Stream obstructed by ice causing backwater.
b Measured through ice 1′ and 6″ to 2′ and 6″ in thickness.
c Measured through ice 1′ and 0″ to 2′ and 0″ in thickness.



Discharge of Wallkill River at New Paltz, Ulster County, N. Y., 1901.

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A current meter measurement of the discharge of Wallkill River, at Rockford Bridge, N. Y., was made August 13, 1900, by E. G. Paul, showing a discharge of 70-second-feet.

Throughout its course the Wallkill flows northeasterly nearly parallel to Hudson River. It joins Rondout River near Lefever Falls, and the two enter Hudson River at Rondout. Together they form the most extensive river system in southeastern New York, aside from the Hudson River.

Mean Monthly Run-off of Wallkill River at New Paltz, Ulster County, N. Y.
[Drainage area, 736 square miles.]

YEAR.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
1901.			
July	521	0.71	0.82
August	2,077	2.83	3.25
September	963	1.31	1.47
October	522	0.71	0.82

Principal Developed Water Powers on Wallkill River in 1901.

Number of dam.	LOCATION.	Name of mill and of owner or operator.	Business or class of manufacture.	WORKING HEAD ON WATER WHEELS, IN FEET.			Water privilege at dam.	Rated power of water wheels at usual head, H. P.	H. P. of engines.	Remarks.
				Greatest.	Least.	Average.				
1	Creek Locks.	Empire Powder Mill, Laflin & Rand Powder Company	Black blasting powder	19	9	14	Entire	288	100	
2	Rifton	Rifton Grist Mill, J. W. Dimick, Jr.	Grist mill			16		119		
3	Rifton	J. M. Dimick Company	Velvet carpets and Wilton rugs.	32	21		Entire	679		
4	Dashville		Abandoned grist mill	42						Abandoned about 1845.
5	Galeville		Abandoned grist mill			10				
6	Wallkill	J. C. Hedden	Hat factory	14			Entire			
7	Waldon	Waldon Knife Company	Pocket cutlery	12	11	8	432 sq. inches	150	75	
8	Waldon	N. Y. Knife Works	Cutlery	33	31½	32		300	None.	
9	Montgomery	Crabtree and Patchett	Worsted yarns			9	Entire	160	75	
10	Red Mills	Red Mill*	Grist mill			10	Entire		None.	

*On Shawangunk Kill.

Mean Daily Gauge Height of Wallkill River at New Paltz, Ulster Co., N. Y.
[Drainage area, 736 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	......	......	......	......	....	......	......	6.10	9.20	7.45	6.00	6.25
2	......	......	......	......	....	......	......	5.90	9.85	7.25	6.00	6.05
3	......	......	......	......	....	......	......	5.97	9.75	7.15	6.00	6.00
4	......	......	......	......	....	......	......	6.00	9.35	7.00	6.00	6.20
5	......	......	......	......	....	......	......	6.45	8.55	6.95	6.05	6.35
6	......	......	......	......	....	......	......	6.45	8.35	6.85	6.10	6.65
7	......	......	......	......	....	......	7.28	12.05	8.05	6.65	6.00	6.60
8	......	......	......	......	....	......	7.23	11.25	7.70	6.47	5.95	7.30
9	......	......	......	......	....	......	6.93	9.30	7.48	6.35	5.85	10.00
10	......	......	......	......	....	......	6.65	9.15	7.45	6.30	5.75	12.80
11	......	......	......	......	....	......	6.53	9.10	7.25	6.30	5.65	11.70
12	......	......	......	......	....	......	7.33	8.05	7.05	6.20	5.95	10.30
13	......	......	......	......	....	......	7.60	7.70	7.15	6.20	6.40	10.05
14	......	......	......	......	....	......	7.15	7.15	6.95	6.35	7.00	10.60
15	......	......	......	......	....	......	6.85	7.40	6.65	7.50	6.90	13.30
16	......	......	......	......	....	......	6.55	7.10	6.75	7.85	6.55	12.85
17	......	......	......	......	....	......	6.37	6.75	7.05	7.50	6.25	13.10
18	......	......	......	......	....	......	7.15	9.25	7.63	7.27	6.05	13.65
19	......	......	......	......	....	......	7.98	11.15	7.65	7.15	6.15	13.75
20	......	......	......	......	....	......	7.20	10.15	7.45	6.95	6.35	12.95
21	......	......	......	......	....	......	6.50	10.25	7.30	6.70	7.30	11.70
22	......	......	......	......	....	......	6.35	10.25	7.10	6.45	8.10	10.70
23	......	......	......	......	....	......	6.25	10.15	6.95	6.32	8.65	10.45
24	......	......	......	......	....	......	6.05	9.70	6.83	6.30	8.35	10.15
25	......	......	......	......	....	......	6.00	14.30	6.65	6.20	8.10	9.55
26	......	......	......	......	....	......	6.00	12.00	6.50	6.12	7.45	9.00
27	......	......	......	......	....	......	5.85	11.25	6.35	6.10	6.95	9.25
28	......	......	......	......	....	......	5.85	10.60	6.35	6.10	6.85	9.70
29	......	......	......	......	....	......	5.85	10.10	6.65	6.10	6.65	11.80
30	......	......	......	......	....	......	5.80	9.90	7.25	6.10	6.45	19.35
31	......	......	......	......	....	......	5.95	9.15	.....	6.50	.....	19.20
1902.												
1	15.15	8.75	23.525	9.35	10.2	57.5	7.25	9.5	6.10	10.25	8.65	6.8
2	13.1	8.75	23.8	8.95	8.9	57.25	7.15	9.1	6.05	10.85	8.35	6.7
3	12.95	10.65	24.65*b*	8.65	9.1	57.05	7.8	8.75	6.00	10.15	8.15	7.5
4	12.1	9.7	22.75	8.20	8.8	56.9	7.575	8.6	5.88	9.65	7.95	7.95
5	10.45	9.75	20.25	8.0	8.3	56.55	7.075	8.3	5.78	9.60	7.65	8.1
6	10.7	8.9	15.2	9.7	7.9	56.35	6.775	7.95	5.70	10.10	7.50	8.55
7	10.2	8.15	13.2	7.7	7.5	6.3	6.526	7.85	5.60	9.45	7.50	8.10
8	9.7	7.85	12.7	8.4	7.4	56.25	6.35	7.65	5.50	9.00	7.65	7.70
9	9.15	7.775	14.95	13.65*a*	7.3	56.3	6.225	7.3	5.50	8.55	7.15	7.70
10	8.85	7.7	16.45	13.5	7.1	6.5	6.325	7.05	6.10	8.40	6.95	7.65
11	8.75′	7.55	15.9	12.2	6.8	6.35	6.0	6.9	6.45	8.25	6.75	7.60
12	8.2	7.55	16.1	11.65	6.6	56.3	6.0	6.8	6.30	12.45	6.7	7.60
13	8.05	7.4	17.05	10.65	6.6	6.2	5.90	6.75	6.35	11.90	6.6	7.55
14	8.05	7.35	16.5	9.8	6.5	56.15	5.775	6.685	6.45	10.50	6.6	7.5
15	8.0	7.15	15.0	9.35	6.5	6.1	5.7	6.6	6.25	9.70	6.6	7.5
16	8.0	7.1	14.65	8.65	6.4	56.20	5.7	6.525	6.15	9.35	6.5	7.5
17	7.7	7.2	15.4	8.2	6.4	56.25	5.725	6.425	6.05	9.00	6.5	12.2
18	7.55	7.15	13.75	8.0	6.3	6.15	5.575	6.375	5.95	8.60	6.5	12.25
19	7.5	7.075	11.75	7.85	6.3	6.125	5.55	6.275	5.80	8.60	6.5	12.3
20	7.2	7.0	10.5	7.6	6.3	6.1	6.1	6.2	5.90	8.15	6.5	12.3
21	7.2	7.05	10.3	7.45	6.3	6.125	7.5	6.3	5.90	7.95	6.4	12.95
22	18.5	7.05	10.2	7.35	6.3	6.325	8.65	6.1	5.90	7.65	6.4	19.0
23	17.65	7.1	9.75	7.15	6.2	56.4	7.4	6.05	5.90	7.47	6.65	19.65
24	13.55	7.25	9.6	7.1	6.2	6.35	10.7*d*	6.1	5.90	7.37	6.3	17.20
25	13.15	7.3	9.45	6.95	6.2	6.2	*e* 14.0	6.05	6.15	7.15	6.3	16.25
26	12.2	7.75	9.0	6.85	6.4	56.2	9.1	6.0	9.65	6.95	6.35	15.30
27	12.85	11.4	8.5	7.0	8.3	6.1	8.5	6.0	12.00	6.85	7.35	14.20
28	12.65	12.75	8.2	6.45	9.2	6.25	7.8	5.95	11.90	11.65	7.35	....
29	11.065	......	10.2	6.65	8.4	6.35	7.45	8.25	13.45	11.25	7.1	....
30	9.5	......	11.05	11.75*c*	8.3	7.0	7.45	7.25	10.35	9.45	6.95	....
31	9.25	......	9.9	......	7.9	.. ..	8.45	......	.....	8.95	.....	....

a Highest water 14.6 at p. m.
b Highest water 24.80 at p. m.
c Highest water 12.6 at p. m.
d Highest water 15.4 at 8 p. m.
e Highest water 16.6 at 9 p. m.

Mean Daily Flow in Second-feet of Wallkill River at New Paltz, Ulster Co., N. Y.
[Drainage area, 736 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	....	....	....	....	....	....	......	264	1,940	886	220	330
2	....	....	....	....	....	....	......	190	2,423	790	220	242
3	....	....	....	....	....	....	......	212	2,345	742	220	220
4	....	....	....	....	....	....	......	220	2,045	670	220	308
5	....	....	....	....	....	....	......	418	1,503	647	242	374
6	....	....	....	....	....	....	......	418	1,380	601	264	509
7	....	....	....	....	....	....	801	4,328	1,200	509	220	486
8	....	....	....	....	....	....	780	3,590	1,014	429	205	814
9	....	....	....	....	....	....	638	2,010	898	374	175	2,540
10	....	....	....	....	....	....	509	1,905	886	352	145	4,568
11	....	....	....	....	....	....	453	1,870	790	352	115	3,998
12	....	....	....	....	....	....	828	1,200	694	308	205	2,786
13	....	....	....	....	....	....	962	1,014	742	308	396	2,540
14	....	....	....	....	....	....	742	742	647	374	670	3,084
15	....	....	....	....	....	....	1,092	862	509	910	624	5,588
16	....	....	....	....	....	....	463	718	555	1,092	463	5,117
17	....	....	....	....	....	....	382	555	694	910	330	5,376
18	....	....	....	....	....	....	742	1,975	974	802	242	5,968
19	....	....	....	....	....	....	1,159	3,502	988	742	286	6,080
20	....	....	....	....	....	....	766	2,622	886	647	374	5,219
21	....	....	....	....	....	....	440	2,745	814	532	814	3,998
22	....	....	....	....	....	....	374	2,745	718	418	1,230	4,118
23	....	....	....	....	....	....	330	2,663	647	363	1,569	2,909
24	....	....	....	....	....	....	242	2,306	589	352	1,380	2,663
25	....	....	....	....	....	....	220	6,714	509	308	1,230	2,189
26	....	....	....	....	....	....	220	4,280	440	275	1,380	1,800
27	....	....	....	....	....	....	175	3,590	374	264	647	1,975
28	....	....	....	....	....	....	175	3,034	374	264	601	2,306
29	....	....	....	....	....	....	175	2,622	509	264	509	4,092
30	....	....	....	....	....	....	160	2,462	790	264	418	*a*
31	....	....	....	....	....	....	205	1,905	......	440	......	*a*
Mean	....	....	....	....	....	....	521	2,077	963	522	520	2,832

FISHKILL CREEK AT GLENHAM, DUTCHESS COUNTY, NEW YORK.

The headwaters of Fishkill Creek drain the western slope of Chestnut Ridge Mountains. In its upper reaches the stream receives the drainage from extensive swamp and flat lands. The lower reaches of the stream flow along the foot of the Fishkill Range. From Fishkill Village to Fishkill Landing, where it empties into tide water of Hudson River, it falls over slate rock ledges, making a descent of 200 feet in five miles. This fall is largely utilized to provide water power for manufactories on its banks. As a result, the stream becomes greatly polluted from manufacturing waste and other impurities which it receives. The extent and character of the manufactures are shown in the accompanying table at page 288.[b]

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[a] Exceeds limit of rating curve.

[b] For effect on streams of waste from above classes of manufacture see Sewage Disposal in the United States, Rafter and Baker, pp. 32–72.

The gauging station is situated at the Newburgh, Dutchess and Connecticut R. R. bridge in Glenham. It was established July 8, 1901. A box weight gauge with scale graduated decimally from zero to 15 feet was attached to the upstream guardrail of the bridge. The water height is observed each morning and evening by the gauge reader, C. E. Carey. The bridge consists of a main central span with two auxiliary overflow channels at the ends, the length of span being as follows:

Left-hand overflow	stations 0.0 to 22.5
Main span	station 27.5 to station 122.0
Right-hand overflow	station 127.0 to station 149.0

The bed of the main channel is earth and gravel, that of the overflow channels is of loose broken stone. The bench mark is an " 0 " chiseled in the upstream corner of the left-hand pier of the main bridge span.

Elevation of bench mark	100.00
Elevation of water surface when gauge reads zero	82.22

The location of the gauging station is shown on the Poughkeepsie Sheet of the Topographic Atlas of the U. S. Geological Survey.

Current Meter Measurements of Fishkill Creek at Glenham, Dutchess County, N. Y.

DATE.	Gauge height. feet.	Discharge, second-feet.	Hydrographer.
1901.			
July 24	3.60	60	A. E. Place.
October 12	3.80	97	G. B. Hollister.
November 11	3.85	82	W. W. Schlecht.
August 15	3.85	110	A. E. Place.
September 27	3.86	90	W. W. Schlecht.
July 20	3.90	135	A. E. Place.
July 8	3.92	147	Horton and Hollister.
November 20	3.95	114	W. W. Schlecht.
October 5	3.98	126	W. W. Schlecht.
October 15	4.05	137	W. W. Schlecht.
September 6	4.15	193	A. E. Place.
September 18	4.22	229	A. E. Place.
December 24	4.52	315	W. W. Schlecht.
August 31	4.56	342	A. E. Place.
August 30	4.60	335	A. E. Place.
December 13	4.62	375	W. W. Schlecht.
October 15	5.10	579	W. W. Schlecht.
December 31	7.43	2,210	W. W. Schlecht.[a]
1902.			
August 26	3.04	48.5	H. K. Barrows.
July 14	3.18	64.4	H. K. Barrows.
August 11	3.51	115	H. K. Barrows.
November 25	3.65	146	F. H. Tillinghast.
October 11	3.71	155	P. M. Churchill.
June 28	3.785	132.3	W. W. Schlecht.
July 28	3.90	200	H. K. Barrows.
June 17	4.00	212.5	W. W. Schlecht.
November 8	4.00	233	F. H. Tillinghast.
April 25	4.03	152.4[b]	W. W. Schlecht.
May 6	4.46	349.5	W. W. Schlecht.
February 11	4.87	202.5[c]	W. W. Schlecht.
October 20	4.97	697.7	C. C. Covert.
April 12	5.30	772.6	W. W. Schlecht.
March 5	5.79	1,129	W. W. Schlecht.

The freshet of March 1, 1902, exceeded all previous high water records.

Time.	Gauge reading.
7.45 a. m. March 1, 1902	13.6
11 a. m. March 1, 1902	14.5
4.45 p. m. March 1, 1902	12.4

The following table of discharge has been calculated from high-water marks observed for a number of years at the Groveville dam. The dam is of masonry, plank faced, has a straight horizontal crest 4 feet wide, 134 feet long. The discharge has been calculated by means of coefficients for the weir formula derived from Cornell experiment No. 11.

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[a] Surface velocity used.

[b] Probably incorrect.

[c] Ice along banks at gauging station, frozen from bank to bank ninety yards below station, two to nine inches thick.

DATE.	Year.	Depth on plank, :crest feet.	Discharge second-feet.	Second-feet per square mile.
September 24	1882	6.33	7,700	38.5
March 22	1888	5.0	5,200	26.0
December 18	1888	4.5	4,400	22.0
January 12	1891	6.33	7,700	38.5
January 13	1891	4.0	3,650	18.25
January 22	1891	4.0	3,650	18.25
January 23	1891	6.92	8,800	44.0
March 10	1893	5.0	5,200	26.0
March 11	1893	4.25	4,000	20.0
March 12	1893	5.5	6,100	30.5
March 13	1893	5.0	5,200	26.0
March 14	1893	4.0	3,650	18.25
February 7	1896	6.67	8,300	41.5
March 1	1896	4.5	4,400	22.0
March 20	1896	6.67	8,300	41.5
March 1	1902	9.5	13,700	68.5

The drainage area above the Groveville dam is 200 square miles. The intensity of the freshet of March 1, 1902, on the lower Fishkill Creek was probably increased by the formation and later tearing away of an ice blockade on the flood plain opposite Fishkill Village.

A measurement through ice 0.3 to 0.4 foot thick was made by W. W. Schlecht, December 7, 1901. Gauge height, 4.25; discharge 100.7 second-feet.

A measurement of the low-water flow of Clove Creek, the largest tributary of Fishkill Creek, entering near Fishkill Village, was made near the mouth of the stream, September 24, 1902. The discharge was 3.5 second-feet, from a drainage area of twenty square miles; or 0.18 second-feet per square mile.

A mark is painted on the right-hand overflow abutment, labeled "high-water mark, January 22, 1891." The elevation of this mark was found to be 96.15, equivalent to a gauge reading of 13.93 feet, and this is said to be the highest water on record in the stream previous to March, 1902. The drainage area above the gauging station is 198 square miles, and above the mouth of the stream, 204 square miles.

Principal Developed Water Powers on Fishkill Creek in 1901.

Number of dam.	LOCATION.	Name of mill and of owner or operator.	Business or class of manufacture.	WORKING HEAD ON WATER WHEELS, IN FEET.			Water privilege at dam.	Rated power of water wheels at usual head, H. P.	H. P. of engines.	Remarks.
				Greatest.	Least.	Average.				
1	Fishkill	Tironda Hat Works	Hats	....	....	....	Entire	....	....	
2	Fishkill	New York Rubber Company	Rubber goods	24	....	17	Entire	430	250	
3	Fishkill	Rockwell Silk Mills	Silk goods	....	....	....	Entire	....	....	
4	Matteawan	Matteawan Manufacturing Company	Felt hats and bodies	31	20	26	Part	168	225	
5	Matteawan	William Carroll & Co.	Straw hats	....	....	29	Part	283	140	
6	Matteawan	Carroll Electric Company	Electric lighting and power	....	....	20	Entire	....	525	
7	Glenham	Glenham Carpet Mill, Hilton estate	Carpets, rugs and squares	35	30	32½	Entire	460	1,500	Not operated.

Daily Guage Height of Fishkill Creek at Glenham, Dutchess County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	.....	.....	.....	.....	.....	.....	.....	3.95	4.57½	4.05	3.97½	3.90
2	.....	.....	.....	.....	.....	.....	.....	3.82½	4.60	3.97½	3.95	3.98
3	.....	.....	.....	.....	.....	.....	.....	3.77½	4.47½	4.10	3.95	4.05
4	.....	.....	.....	.....	.....	.....	.....	3.67½	4.42½	4.10	3.95	4.08
5	.....	.....	.....	.....	.....	.....	.....	3.65	4.30	4.00	3.90	4.10
6	.....	.....	.....	.....	.....	.....	.....	3.65	4.15	3.92½	3.90	4.25
7	.....	.....	.....	.....	.....	.....	.....	4.70	4.17½	3.90	3.92½	4.28
8	.....	.....	.....	.....	.....	.....	3.90	5.55	4.10	3.87½	3.95	4.18
9	.....	.....	.....	.....	.....	.....	3.90	4.77½	4.07½	3.85	3.90	4.05
10	.....	.....	.....	.....	.....	.....	3.80	4.35	4.02½	3.85	3.87½	4.73
11	.....	.....	.....	.....	.....	.....	3.78	4.12½	4.05	3.85	3.87½	5.33
12	.....	.....	.....	.....	.....	.....	3.83	4.07½	4.37½	3.80	3.92½	4.83
13	.....	.....	.....	.....	.....	.....	3.80	4.02½	4.32½	3.80	4.32½	4.60
14	.....	.....	.....	.....	.....	.....	3.73	3.90	4.15	4.30	4.17½	4.68
15	.....	.....	.....	.....	.....	.....	3.70	3.90	4.10	4.85	4.05	6.78
16	.....	.....	.....	.....	.....	.....	3.65	3.82½	4.25	4.82½	4.00	7.45
17	.....	.....	.....	.....	.....	.....	3.73	3.85	4.15	4.55	3.95	6.18
18	.....	.....	.....	.....	.....	.....	4.23	5.07½	4.22½	4.40	3.95	5.53
19	.....	.....	.....	.....	.....	.....	4.00	4.70	4.12½	4.32½	3.95	5.15
20	.....	.....	.....	.....	.....	.....	3.90	4.40	4.02½	4.22½	3.95	4.98
21	.....	.....	.....	.....	.....	.....	3.77½	4.45	4.02½	4.20	3.93	4.78
22	.....	.....	.....	.....	.....	.....	3.70	4.95	4.00	4.15	3.93	4.73
23	.....	.....	.....	.....	.....	.....	3.65	4.62½	3.92½	4.12½	3.90	4.73
24	.....	.....	.....	.....	.....	.....	3.65	4.70	3.90	4.10	3.90	4.55
25	.....	.....	.....	.....	.....	.....	3.65	6.40	3.87½	4.05	4.35	4.60
26	.....	.....	.....	.....	.....	.....	3.62½	6.55	3.85	4.00	4.33	4.55
27	.....	.....	.....	.....	.....	.....	3.60	5.65	3.80	4.00	4.13	4.85
28	.....	.....	.....	.....	.....	.....	3.45	5.20	3.87½	4.00	4.03	4.15
29	.....	.....	.....	.....	.....	.....	3.57½	4.85	3.95	4.00	4.00	5.75
30	.....	.....	.....	.....	.....	.....	4.35	4.70	4.20	4.00	3.98	8.28
31	.....	.....	.....	.....	.....	.....	4.15	4.57½	.....	3.97½	.....	7.50
1902.												
1	6.05	5.0	13.	4.9	5.475	3.825	3.7	3.8	2.9	4.25	4.4	3.7
2	5.65	4.75	1.0	4.775	4.925	3.7	3.525	3.7	2.8	4.2	4.3	3.73
3	5.5	5.625	8.775	4.675	4.7	3.6	3.45	3.6	2.95	4.0	4.2	3.88
4	5.3	5.55	6.7	4.6	4.725	3.7	3.85	3.6	2.72	3.82	4.15	4.03
5	5.175	5.575	5.8	4.525	4.625	3.7	3.6	3.5	2.9	3.82	4.05	3.98
6	4.95	5.275	4.95	4.45	4.45	3.55	3.7	3.425	2.95	4.2	4.03	3.7
7	4.8	5.25	5.05	4.525	4.35	3.5	3.7	3.45	2.9	4.2	4.0	3.7
8	4.7	5.0	5.15	4.625	4.3	3.85	3.55	3.4	2.92	3.92	4.0	3.8
9	4.65	5.175	5.9	5.125	4.2	3.85	3.45	3.4	3.0	3.85	3.93	3.98
10	4.625	5.05	7.75	5.65	4.1	3.75	3.375	3.3	3.32	3.78	3.9	4.05
11	4.6	4.75	6.95	5.525	3.9	3.6	3.4	3.5	3.25	3.7	3.875	3.85
12	4.575	4.8	6.5	5.275	3.975	3.5	3.3	3.85	3.08	4.95	3.875	3.9
13	4.75	4.6	6.7	5.05	3.95	3.4	3.225	3.65	3.3	5.02	3.875	4.05
14	5.0	4.4	6.625	4.9	3.9	3.425	3.2	3.475	3.22	4.55	3.88	4.1
15	4.7	4.325	5.975	4.8	3.9	3.5	3.125	3.4	3.2	4.35	3.80	4.3
16	4.35	4.25	5.65	4.7	3.9	3.5	3.125	3.35	3.15	4.2	3.83	4.4
17	4.275	4.475	6.725	4.6	3.8	3.95	3.1	3.275	3.15	4.08	3.8	6.65
18	4.25	4.375	6.45	4.575	3.7	3.7	3.1	3.2	3.18	4.0	3.7	7.55
19	4.25	4.325	5.7	4.5	3.75	3.5	3.075	3.2	3.0	4.0	3.7	6.5
20	4.175	4.35	5.2	4.4	3.8	3.5	3.2	3.15	3.05	3.95	3.68	5.98
21	4.175	4.375	5.3	4.35	3.825	3.5	4.15	3.1	3.025	3.9	3.63	5.50
22	5.875	4.85	5.225	4.3	3.675	3.75	4.7	3.15	3.15	3.8	3.6	7.75
23	6.55	4.85	5.125	4.225	3.675	3.6	4.65	3.1	3.075	3.8	3.6	8.05
24	5.15	4.9	5.0	4.15	3.6	3.5	4.1	3.1	3.125	3.7	3.63	7.0
25	4.75	4.7	4.85	4.05	3.6	3.4	4.175	3.15	2.95	3.75	3.63	5.95
26	4.625	4.85	4.75	4.05	4.2	3.5	4.1	3.05	3.475	3.73	3.68	5.6
27	5.0	5.875	4.7	4.125	4.15	3.4	4.05	3.0	3.6	3.7	3.95	5.4
28	5.0	7.1	4.55	4.075	4.575	3.3	3.9	3.0	3.6	4.65	3.88	....
29	4.95	.....	4.85	4.0	4.225	3.35	3.8	2.95	4.8	5.43	3.8	....
30	5.05	.....	5.4	4.825	4.025	4.075	4.2	2.95	4.75	4.93	3.7	....
31	4.95	.....	5.05	.....	3.9	.....	3.95	2.9	.....	4.55	.....	....

CROTON RIVER AT OLD CROTON DAM, WESTCHESTER COUNTY, N. Y.

Croton River drains an area of rough, irregular topography, interspersed with lakes and ponds, situated east of Hudson River, to which the stream is tributary at Croton Landing. This stream serves as the principal source of water supply for New York City.[a] The flow is diverted through a closed masonry aqueduct at what is called the Old Croton dam, to distinguish it from the new Croton dam, also called the Cornell or Quaker Bridge dam, now under construction.[b] The location of the Old Croton dam, and of the adjacent watershed, is shown on the Carmel and Tarrytown Sheets of the topographic atlas of the U. S. Geological Survey. A record has been kept of the flow of Croton River at the Old Croton dam, beginning in 1868. The record includes the quantity of water wasted over the crest of the dam, as well as that diverted for the water supply of New York city. The results of this record, as originally computed, have been widely published.[c]

In the report on New York's water supply, made to Bird S. Coler, Comptroller, by John R. Freeman, 1900; Appendix No. 1, pages 120-256 inclusive, is devoted to a study of the yield of the Croton Watershed. Mr. Freeman states that the results as heretofore published, average about 10 per cent., or 38,000,000 gallons per day, too large, because of the use of data which was less accurate than that now possessed. Using this later information, he has recomputed the entire record. Owing to the importance of this record, its great length, relative accuracy, and availability for comparison with other streams proposed as sources of water supply for Greater New York, it has been thought well to republish the revised figures which are given below. In computing the record, Mr. Freeman has made the following changes in the methods of calculation:

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[a] See History of Water Supply of New York, 1658-1895, by Edward Wedgman.

[b] The new Croton dam is described in paper by Charles S. Gowen, Transaction Am. Soc. C. E. Vol. XLIII, pp. 469-565.

[c] See Twentieth Annual Report U. S. Geol. Survey, part 4, pp. 81-84 also Report of New York Aqueduct Commission, 1887-1895, pp. 94-101.

1. Revision of the formula for flow over the dam by experiment on model sections at Cornell University Hydraulic Laboratory. In the calculation of the record as hitherto published, the flow over the dam has been calculated, using a constant coefficient in the weir formula of 3.4, based on the experiments of Eytelwein.

2. Gaugings of flow in the Croton Aqueduct have been made and the results used as a basis of calculation of the diversion.

3. The impairment of the carrying capacity of the aqueduct, due to the gradual accumulation of slime or organic growths upon the walls of the conduit, has been taken into consideration.

4. The effect of storage in the natural and artificial reservoirs in the headwaters of the stream, has been allowed for in the calculation, so that the results as given below represent the estimated *natural* run-off of the watershed.

5. Errors in the assumed elevation of the crest, and length of the overfall of the Croton dam, and in the observed depth on the crest of the dam, and depth in the new Croton Aqueduct, have been corrected in making the revised calculations.

The depth on the crest of the dam has been determined by measuring the distance down to the water surface from the corner of the coping stone of the wing wall on the east bank of the stream, at a point just downstream from the intake of the old aqueduct and about 120 feet upstream from the crest. The measurement has been taken at 5 o'clock each morning, and as there are no notable mills on the stream, one measurement a day undoubtedly gives a reliable record of the mean wastage. The dam consists of two portions, having different cross-sections. Both sections are built of cut stone with gravel and riprap or concrete backing, and rest on rock foundations. The longer or round-crested portion is 180.3 feet in length. The crest lip has an elevation varying from 166.170 feet to 166.299 feet. The crest is Ogee shape, the upper portion having a radius of 10 feet; the slope of the upstream side being approximately 6.5 horizontal to 1 vertical. The angular-crested portion of the dam is 71.1 feet in length; its elevation varying from 166.175 to 166.915 feet. The elevation of the point of measuring the depth on the crest is 172.210 feet and the mean elevation of the crest is 5.975 feet lower. The angular-crested portion of the dam has a crest 7 feet in width, sloping backward 1 vertical to 7 horizontal, and an apron having a slope of 5 horizontal to 4 vertical.

Regarding the accuracy of the record as recomputed, Mr. Freeman states that there are probably very few months in the record for which the error is as great as 5 per cent. and believes it probable that the error in the mean run-off for any year rarely, if ever, exceeds 3 per cent. Whatever uncertainty there is comes mainly from the lack of precision in measurement of depth wasting over dam, and from uncertainty as to the condition of interior surface of the two aqueducts, or obstruction therein.

With reference to the effect of storage, the following table is given by Mr. Freeman, showing the total capacity in millions of gallons to crest level of the different reservoirs within the water-shed.

RESERVOIR. 1.	Date when first filled and available. 2.	Approximate area of tributary watershed, square miles. 3.	Area of water surface of storage reservoir in square miles. 4.	Aggregate area of water surface in watershed of reservoir, square miles. 5.	Approximate area of swamp surface in watershed, square miles. 6.	Net area of land surface, square mile. 7.	Per cent of water surface to land surface. 8.	Total capacity of reservoir to level of spillway crest, millions of gallons. 9.
Boyd's Corner, Carmel....	1873	21.43	0.463	0.675	0.0	20.75	3.25	2,727
West Branch.............	1895	19.51	1.560	2.304	0.3	17.21	13.40	10,070
Middle branch...........	1878	20.51	0.672	0.766	0.7	19.74	3.88	4,005
East branch, Bog brook and Sodum..........	1991	76.90	0.640 0.898	2.125	5.0	74.78	2.84	4.145 4.887
Titicus..................	1893	22.80	1.103	1.300	0.5	21.50	6.04	7.163
Amawalk.................	1897	18.32	0.940	2.132	0.05	16.19	13.20	76.78
Old Croton...............	1842	159.3	0.760	1.938	0.7	157.4	1.23	....

The total drainage area above old Croton dam is 338.8 square miles.

In addition to the above artificial reservoirs, the following ponds are controlled by the city: Mahopac, Kirk, Gleneida, Gilead, Barrett, White. These have an aggregate capacity above present level of spillway crests of 2,055,000 gallons.

The following ponds are not controlled by the city, but were drawn upon in the great drought in 1881: Peach, Waccabuc, Cross, China, Pine, Long, Tonetta, Haines. They have an aggregate capacity of 855,000,000 gallons.

In the above estimate of the natural run-of of Croton Watershed, no allowance has been made for the increased loss by evaporation due to the larger proportion of water surface than would have existed in absence of the artificial reservoirs. The area of water surface exposed to evaporation for different periods during the continuation of the record has been as follows:

Percentage of Water Surface in Croton Watershed.

DATE.	Area, square miles.	Per cent.
1868 to 1873	5.8	1.73
1873 to October, 1878	6.2	1.83
1878 to 1891	6.2	1.83
1891 to 1893	8.4	2.48
1893 to 1895	9.5	2.82
1895 to 1897	11	3.28
1897 to 1900	12	3.56

Observed Monthly Flow of Croton River at Old Croton Dam, Westchester County, N. Y. in Second-Feet.(*a*)

MONTH.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.
January	514	588	1,040	152	537	1,128	2,433	158	373
February	282	574	1,253	644	336	481	801	1,202	1,040
March	1,148	1,462	928	921	452	1,063	783	846	1,869
April	1,029	916	1,214	532	837	1,960	979	1,527	1,703
May	1,567	749	469	531	323	559	829	470	517
June	893	354	218	377	317	142	238	150	181
July	288	158	132	181	155	127	367	145	139
August	541	90	132	221	427	186	227	1,431	130
September	1,485	54	97	164	322	138	153	226	102
October	778	701	111	523	282	368	203	212	101
November	931	563	167	1,012	716	453	184	588	186
December	408	846	156	589	365	786	237	460	172

MONTH.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
January	207	758	362	709	192	614	291	523	115
February	424	1,122	798	817	1,323	128	1,009	1,513	738
March	1,818	1,016	1,120	764	1,589	1,364	763	1,343	534
April	794	444	1,380	551	498	376	736	814	709
May	229	395	492	229	353	603	348	495	408
June	159	388	235	138	455	450	181	178	155
July	130	186	186	138	147	176	132	212	132
August	127	169	368	132	132	132	132	311	149
September	93	693	296	132	132	899	133	193	118
October	271	237	162	130	132	582	170	142	141
November	1,168	557	209	152	124	252	181	265	565
December	506	2,053	495	138	461	334	161	1,030	548

MONTH.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
January	930	758	1,097	1,204	605	1,903	1,006	503
February	1,429	1,496	1,375	692	9,448	1,757	418	863
March	658	996	1,286	518	1,306	1,170	507	1,723
April	1,289	913	1,399	704	910	681	330	958
May	560	342	718	453	709	249	391	1,621
June	212	320	374	388	416	220	331	283
July	156	710	147	418	229	221	248	251
August	147	951	288	1,115	164	229	241	292
September	132	246	905	627	580	223	266	254
October	132	274	678	506	910	217	232	334
November	234	261	859	1,491	572	189	419	422
December	314	650	1,439	1,253	450	333	441	880

MONTH.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.
January	444	795	348	371	1,010	1,075	......	......
February	620	309	702	644	1,470	871	......	......
March	1,363	907	1,564	828	886	2,051	......	......
April	653	1,067	791	681	597	1,119	......	......
May	498	351	158	764	1,318	336	......	......
June	424	255	311	405	526	351	......	......
July	258	255	289	719	320	340	......	......
August	249	265	313	826	599	354	......	......
September	261	277	300	342	350	348	......	......
October	244	254	302	300	391	353	......	......
November	659	244	439	308	568	353	......	......
December	599	255	309	608	903	351	......	......

(*a*) Based on table on pages 204–5 of Freeman's report.

Observed Monthly Flow of Croton River at Old Croton Dam, Westchester County, N. Y.

[In second-feet per square mile.]

MONTH.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.
January	1.52	1.74	3.07	.447	1.58	3.33	8.19	.46	1.10
February	.68	1.69	3.70	1.90	.99	1.42	2.37	3.55	3.07
March	3.39	4.32	2.74	2.71	1.33	3.14	2.31	2.49	5.52
April	3.04	2.71	3.50	1.57	2.47	5.79	2.89	4.51	5.03
May	4.64	2.21	1.38	1.56	96	1.65	2.45	1.39	1.53
June	2.64	1.05	.64	1.12	.94	.42	.70	.44	.53
July	.85	.46	.39	.53	.46	.37	1.08	.43	.41
August	1.59	.26	.39	.65	1.26	.55	.67	4.22	.38
September	.44	.16	.28	.48	.95	.41	.45	.67	.30
October	2.29	2.07	.33	1.54	.83	1.09	59	.63	.29
November	2.75	1.66	.49	2.98	2.12	1.34	.51	1.74	.55
December	1.21	2.49	.43	1.74	1.08	2.32	.699	1.36	.36
Year	2.45	1.74	1.44	1.43	1.24	1.84	1.83	1.81	1.58

MONTH.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
January	.61	2.24	1.07	2.09	.56	1.81	.86	1.54	3.38
February	1.25	3.31	2.36	2.41	3.91	3.79	2.98	4.47	2.18
March	5.37	3.00	3.31	2.26	4.69	4.03	2.25	3.96	1.57
April	2.34	1.31	4.08	1.63	1.47	1.11	2.17	2.40	2.09
May	.67	1.17	1.15	.67	1.04	1.78	1.03	1.46	1.21
June	.47	1.147	.69	.41	1.34	1.33	.53	.52	.46
July	.38	.55	.55	.41	.43	.52	.41	.63	.39
August	.37	.49	1.08	.38	.41	.41	.41	.92	.44
September	.27	1.87	.87	.39	.41	2.65	.39	.57	.35
October	.79	.69	.48	.38	.41	1.72	.50	.42	.42
November	3.45	1.64	.62	.44	.36	.74	.53	.78	1.67
December	1.49	6.06	1.46	.41	1.36	.98	.47	3.04	1.62
Year	1.46	1.95	1.49	.98	1.35	1.73	1.03	1.72	1.31

MONTH.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
January	2.75	2.24	3.24	3.55	1.78	5.62	2.97	1.49
February	4.22	4.42	4.06	2.04	2.82	5.19	1.23	2.55
March	1.94	2.94	3.79	1.62	3.86	3.45	1.49	5.09
April	3.81	2.69	4.13	2.08	2.68	2.01	.97	2.83
May	1.65	1.01	2.12	1.34	2.09	.74	1.15	4.79
June	.63	.94	1.11	1.45	1.35	.64	.98	.84
July	.46	2.09	.43	1.23	.66	.65	.73	.74
August	.43	2.81	.85	3.29	.48	.67	.71	.86
September	.39	.72	2.67	1.85	1.71	.66	.78	.75
October	.39	.81	2.00	1.49	2.68	.64	.68	.98
November	.69	.77	2.54	4.41	1.69	.56	1.24	1.25
December	.93	1.92	4.25	3.70	1.33	.98	1.30	2.60
Year	1.50	1.93	2.59	2.32	1.91	1.80	1.19	2.065

MONTH.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.
January	1.31	2.35	1.03	1.096	2.98	3.17	......	......
Ferbuary	1.83	.91	2.07	1.90	4.34	2.57	......	......
March	4.03	2.68	4.62	2.44	2.62	6.06	......	......
April	1.93	3.15	2.34	2.01	1.76	3.30	......	......
May	1.47	1.04	.47	2.26	3.89	.99	......	......
June	1.25	.75	.92	1.19	1.55	1.03	......	......
July	.76	.75	.85	2.13	.95	1.01	......	......
August	.74	.78	.92	2.44	1.77	1.05	......	......
September	.77	.82	.88	1.01	1.03	1.02	......	......
October	.72	.75	.89	.88	1.15	1.04	......	......
November	1.95	.72	1.29	.91	1.67	1.04	......	......
December	1.77	.75	.91	1.79	2.67	1.03	......	......
Year	1.54	1.29	1.47	1.68	2.19	1.94	......	......

Observed Monthly Flow of Croton River at Old Croton Dam, Westchester County, N. Y., in Millions of U. S. Gallons, per Day.

MONTH.	1868.	1869.	1870.	1M71.	1872.	1873.	1874.	1875.
January	332	380	672	98	347	729	1,573	102
February	150	371	810	416	217	311	518	777
March	742	945	600	595	292	687	506	547
April	665	592	785	344	541	1,267	633	987
May	1,013	484	303	343	209	361	536	304
June	577	229	141	244	205	92	154	97
July	186	102	85	117	100	82	237	94
August	350	58	85	143	276	120	147	925
September	960	35	63	106	208	89	99	146
October	503	453	72	338	182	238	131	137
November	602	364	108	654	463	293	119	380
December	264	547	101	381	236	508	153	297

MONTH.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.
January	241	134	490	234	458	124	397	188
February	672	274	725	516	528	855	830	652
March	1,208	1,175	657	724	494	1,027	882	493
April	1,101	513	287	892	356	322	243	476
May	334	148	255	318	148	228	390	225
June	117	103	251	152	89	294	291	117
July	90	84	120	120	89	95	114	85
August	84	82	109	238	85	85	085	85
September	66	60	409	191	85	85	581	86
October	65	175	153	105	84	85	376	110
November	120	755	360	135	98	80	163	117
December	79	327	1,327	320	89	298	216	104

MONTH.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.
January	338	740	601	490	709	778	391	1,230
February	978	477	924	967	889	447	617	1,136
March	868	345	425	644	831	354	844	756
April	526	458	733	590	904	455	588	440
May	320	264	362	221	464	293	458	161
June	115	100	137	207	242	251	269	142
July	137	85	101	459	95	270	144	143
August	201	96	95	615	186	721	106	148
September	125	76	85	159	585	405	375	144
October	82	91	85	177	438	327	588	140
November	171	365	151	169	555	964	370	122
December	666	354	203	420	930	810	291	215

MONTH.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
January	650	325	287	514	225	240	653	695
February	270	558	401	200	454	416	950	563
March	328	1,114	881	586	1,011	535	573	1,326
April	213	619	422	690	511	440	386	723
May	253	1,018	322	227	102	494	852	217
June	214	183	274	165	201	262	340	227
July	160	162	167	165	187	465	207	220
August	156	189	161	171	202	534	387	229
September	172	164	169	179	194	221	226	225
October	150	216	158	164	195	194	253	228
November	271	273	426	158	284	199	377	228
December	285	569	387	165	200	393	584	227

Total Monthly Run-off of Croton River in Inches on Drainage Area.

MONTH.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.
January	1.75	2.01	3.54	.51	1.82	3.84	9.44	.53	1.27
February	.73	1.76	3.85	1.98	1.06	1.48	2.46	3.69	3.31
March	3.91	4.98	3.16	3.12	1.53	3.62	2.66	2.87	6.36
April	3.39	3.02	4.01	1.75	2.75	6.46	3.23	5.03	5.61
May	5.35	2.55	1.59	1.79	1.11	1.90	2.82	1.60	1.76
June	2.95	1.17	.71	1.25	1.05	.47	.78	.49	.59
July	.98	.53	.45	.61	.53	.43	1.24	.49	.47
August	1.83	.30	.45	.75	1.45	.63	.77	4.86	.44
September	.49	.18	.31	.54	1.06	.46	.50	.75	.33
October	2.64	2.38	.38	1.77	.95	1.26	.68	.73	.33
November	3.07	1.85	.55	3.33	2.36	1.49	.60	1.94	.61
December	1.395	2.87	.53	2.01	1.25	2.67	.80	1.57	.42

MONTH.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
January	.70	2.58	1.23	2.41	.64	2.08	.99	1.77	3.89
February	1.30	3.45	.37	2.60	4.07	3.95	3.10	4.82	2.27
March	6.19	3.46	3.82	2.61	5.41	4.65	2.59	4.56	1.81
April	2.61	1.46	4.55	1.82	1.64	1.24	2.42	2.68	2.33
May	1.20	1.35	1.67	.77	1.20	2.05	1.18	1.68	1.39
June	.52	1.27	.77	.46	1.49	1.48	.59	.58	.51
July	.44	.63	.63	.47	.49	.60	.47	.73	.45
August	.43	.56	1.24	.44	.47	.47	.47	1.06	.51
September	.30	2.08	.97	.44	.46	2.95	.44	.64	.39
October	.91	.79	.55	.44	.47	1.98	.57	.48	.48
November	3.85	1.83	.69	.49	.40	.83	.59	.87	1.86
December	1.72	6.98	1.68	.47	1.57	1.13	.54	3.50	1.87

MONTH.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
January	3.17	2.58	3.73	4.09	2.05	6.48	3.42	1.72
February	4.39	4.60	4.38	2.12	2.94	5.40	1.33	2.65
March	2.24	3.39	4.37	1.87	4.45	3.97	1.72	5.87
April	4.25	3.00	4.61	2.32	2.99	2.24	1.08	3.16
May	1.90	1.16	2.44	1.54	2.41	.85	1.32	5.52
June	.70	1.05	1.24	1.62	1.51	.71	1.09	.94
July	.53	2.41	.49	1.42	.76	.75	.84	.85
August	.49	3.24	.98	3.79	.55	.77	.82	.99
Septemper	.44	.80	2.98	2.06	1.91	.74	.87	.84
October	.45	.93	2.30	1.72	3.09	.74	.78	1.13
November	.77	.86	2.83	4.92	1.88	.62	1.38	1.39
December	1.07	2.21	4.90	4.26	1.53	1.13	1.50	2.99

MONTH.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.
January	1.51	2.71	1.18	1.26	3.44	3.65	......	......
February	1.90	.95	2.25	1.98	4.52	2.68	......	......
March	4.65	3.09	5.33	2.81	3.02	6.98	......	......
April	2.15	3.52	2.61	2.24	1.96	3.68	......	......
May	1.69	1.20	.54	2.61	4.48	1.14	......	......
June	1.39	.83	1.03	1.33	1.73	1.15	......	......
July	.88	.86	.98	2.46	1.09	1.16	......	......
August	.85	.90	1.06	2.81	2.04	1.21	......	......
September	.86	.92	.98	1.13	1.15	1.14	......	......
October	.83	.86	1.03	1.01	1.33	1.20	......	......
November	2.18	.80	1.44	1.02	1.86	1.16	......	......
December	2.04	.86	1.05	2.06	3.08	1.19	......	......

In estimating the relation of rainfall to run-off on this watershed, the mean monthly rainfall, as given in the following table, has been used by Mr. Freeman. This table is made up from rain gauge records kept at the following places:

1870 to 1876, Boyd's Corners.

1877, average of Boyd's and Croton records.

1878 to 1881, average of Boyd's, Croton and Middle Branch records.

1882 to 1900, average of Boyd's, Croton, Middle Branch and Carmel records.

These rainfall records have been used in estimating the percentage of run-off as hitherto published. The present change in the estimated run-off produces a change in the percentage of rainfall to run-off, and the values of this percentage deduced by Mr. Freeman are given below.

Total Monthly Precipitation on Croton River Watershed in Inches.

MONTH.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.
January	2.90	3.79	4.51	3.80	1.44	5.66	6.96	2.74
February	1.38	3.64	6.40	3.81	1.22	3.09	2.78	3.47
March	2.55	5.48	3.80	4.27	2.59	3.08	1.57	4.99
April	3.87	2.11	5.45	3.01	3.04	3.77	6.31	3.04
May	8.79	4.52	2.30	3.45	3.69	2.91	1.99	1.08
June	4.53	3.59	2.06	5.73	4.00	.71	3.57	3.02
July	2.13	2.26	3.43	5.07	4.34	2.21	5.98	3.10
August	6.98	1.92	5.10	5.24	5.99	5.73	2.75	10.33
September	9.33	3.20	2.85	1.44	3.69	3.73	3.56	2.11
October	0.87	9.46	4.73	6.18	2.15	5.13	2.40	3.61
November	4.65	2.43	2.51	4.35	4.01	3.72	2.72	4.61
December	2.35	5.96	1.49	2.59	3.68	4.13	1.78	1.56

MONTH.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.
January	1.42	2.86	4.71	2.79	3.43	4.85	4.68	3.40
February	4.91	0.94	4.06	3.14	3.40	5.25	5.72	5.38
March	6.33	8.11	3.04	4.57	3.90	6.54	3.99	1.78
April	4.43	2.47	3.05	4.76	3.57	1.27	1.42	3.42
May	3.99	0.76	4.67	2.29	1.04	4.03	5.92	2.56
June	2.52	5.16	4.18	5.27	1.40	4.67	2.74	4.52
July	3.42	5.26	4.05	5.87	5.86	2.48	3.13	4.89
August	1.20	2.75	3.06	6.95	4.16	2.46	3.16	2.69
September	5.21	1.36	7.83	3.32	2.42	0.78	14.63	2.61
October	1.50	9.15	4.10	0.60	2.83	2.95	2.86	6.24
November	3.40	7.95	4.79	2.95	2.32	5.23	1.61	1.56
December	2.35	1.46	7.62	4.44	2.59	6.18	2.49	3.65

Total Monthly Precipitation on Croton River Watershed in Inches—(Concluded).

MONTH.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.
January	4.87	5.41	5.42	5.77	5.31	5.05	2.54	9.06
February	5.52	4.44	4.92	6.29	5.02	2.25	4.38	5.71
March	3.99	1.26	3.91	3.72	5.81	1.76	6.09	3.42
April	2.88	2.27	3.84	3.09	2.57	4.45	3.43	3.02
May	3.90	2.09	4.28	0.31	6.04	2.96	5.84	1.59
June	2.52	1.17	3.28	6.79	2.24	3.87	3.97	2.13
July	6.31	5.01	5.31	11.23	2.41	9.77	5.07	.08
August	6.89	6.71	3.09	6.73	6.60	3.73	4.27	5.05
September	0.85	1.10	2.29	1.70	10.00	6.42	6.78	1.97
October	2.92	5.17	2.14	3.56	4.69	3.87	6.73	2.32
November	4.24	5.96	5.39	2.52	4.07	8.54	1.09	3.49
December	6.39	3.08	3.87	5.58	5.93	3.03	3.86	5.36

Relation of Annual Precipitation to Run-off on Croton Watershed.(a)

[Drainage area, 338.8 square miles.]

	Rainfall in inches.	Run-off in inches.	Difference or evaporation, inches.	Run-off as a percentage of rainfall.
1868	50.33	33.33	17.00	66.22
1869	48.36	23.61	24.75	48.82
1870	44.63	19.20	25.43	43.02
1871	48.94	19.46	29.48	39 76
1872	40.74	16.92	23.82	41.53
1873	43.87	25.02	18.85	57.03
1874	42.37	25.10	17.27	59.24
1875	43.66	24.77	18.89	56.73
1876	40.68	21.09	19.59	51.84
1877	48.23	20.22	28 01	41.92
1878	55.70	27.17	28.53	48.78
1879	47.04	19.65	27.39	41.77
1880	36.92	12 63	24.29	34 21
1881	46.69	19.25	27.44	41 23
1882	52.35	24.28	28.07	46.38
1883	42.70	13.33	29.37	81.22
1884	51.28	24.08	27.20	46.96
1885	43.67	17.71	25.96	40.55
1886	47.74	20.10	27.64	42.10
1887	57.29	26.61	30.68	46.45
1888	60.69	35.29	25.42	58 12
1889	55.70	31.39	24.31	56.36
1890	54.05	25.95	28.10	48.01
1891	47.20	23.48	23.72	49.75
1892	44.28	17.68	26.60	39.93
1893	54.87	29 05	25.82	52.94
1894	47.33	20.56	26 77	43.44
1895	40.58	15.95	24.63	39.31
1896	45.85	23.26	22 59	50 73
1897	53.12	25.59	27.53	48.17
1898	57.40	29.72	27.68	51.77
1899	44.67	22.28	22.39	49.88
1900	....	....	....	....
1901	....	....	....	....

a In this table the actual run-off or observed wasteage and draught at old Croton dam has been compensated for filling or lowering of the storage supply, so that the results represented as nearly as may be what the run-off would have been if no artificial storage existed within the watershed. The resulting annual run-off in inches differs somewhat from the totals of the monthly run-off in the preceding tables, which show the actual flow of the stream with storage as it existed at the time the gaugings were taken.

TEN MILE RIVER BELOW DOVER PLAINS, DUTCHESS COUNTY, N. Y.

This stream is tributary to Housatonic River below Gaylordsville, Conn. A gauge station was established September 15, 1901, by A. E. Page at Tabor's Bridge which crosses Ten Mile River about 2,000 feet below the point of inflow of Swamp River. The gauging station is situated about two miles below Dover Plains Village. Its location may be seen on the Clove Sheet of the Topographic Atlas of the United States Geological Survey.

Tabor's Bridge consists of a single span 85 feet between abutments. The bridge stands squarely across the stream, the bed of which is sand and gravel. The entire flow passes between the abutments of this bridge except at the time of extreme high water of nearly every spring, when the river overflows its bank and some water passes around one end of the bridge. During extreme low water, measurements may be made by wading, a short distance below the inflow of Swamp River. A 13-foot boxed weight and wire gauge was attached to foot plates bolted to horizontal chords of the bridge in the first panel from the right hand end of the upstream side. The water stage is observed twice daily, morning and evening, by the gauge reader, J. J. O'Brien. The bench mark is an oval chisel draft near the bridge seat of the right-hand truss on the upstream side of the abutment.

Elevation of bench mark...........................	100.00
Elevation of water surface when gauge reads zero....	83.80

The tributary watershed of Ten Mile River lies almost wholly in New York State. The drainage area, above the proposed dam site, one-half mile above Webatuck Village, is estimated by John R. Freeman at 200 square miles. An area of 5.5 square miles intervenes between this dam site and the gauging station. The drainage area above the gauging station is 195 square miles.

Current Meter Discharge Measurements of Ten Mile River, at Tabor's Bridge, Below Dover Plains, Dutchess County, N. Y.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1901.			
September 16	5.27	245.4	A. E. Place.
September 28	4.36	70.3	W. W. Schlecht.
November 11	4.75	121.5	W. W. Schlecht.
November 22	4.76	123.4	W. W. Schlecht.
November 22	4.76	120.9	W. W. Schlecht.
November 6	4.88	140.1	W. W. Schlecht.
October 26	5.01	187.6	W. W. Schlecht.
December 27	6.54	554.0	W. W. Schlecht.
October 15	7.19	692.8	W. W. Schlecht.
December 17	8.41	1,213.4	W. W. Schlecht.
1902.			
September 2	3.95	63	H. K. Barrows.
August 19	4.28	100	H. K. Barrows.
June 10	4.45	158	W. W. Schlecht.
February 13	4.67	179 [a]	W. W. Schlecht.
August 4	4.69	184.8	H. K. Barrows.
November 28	4.80	211	F. H. Tillinghast
November 14	4.87	211	F. H. Tillinghast.
May 15	4.88	230	W. W. Schlecht.
June 30	4.92	249	W. W. Schlecht.
May 28	5.50	380	W. W. Schlecht.
October 2	5.80	443	P. M. Churchill.
April 15	6.13	526	W. W. Schlecht.
April 7	6.18	558	W. W. Schlecht.
May 2	6.46	640	W. W. Schlecht.
July 21	7.18	821	H. K. Barrows.
December 19	8.28	1,330	F. H. Tillinghast
March 3	10.41	2,386	W. W. Schlecht.

In addition to the above discharge measurements, a guaging of Swamp River was made by A. E. Place and R. E. Horton, just above its mouth, September 17, 1901, showing the volume of flow to be 38 second-feet, the gauge height being 5.9 feet.

Two measurements of Ten Mile River at Webatuck, Dutchess County, N. Y., were made by E. G. Paul in 1900 as follows:

August 9.—Discharge, 46 second-feet.

October 20.—Discharge, 32 second-feet.

Water is diverted from a small tributary of Ten Mile River at the so-called Seven Wells, one mile above the gauging station, for the supply of the village of Dover Plains. The amount of diversion is very small.

Before the decline in prices of wrought iron, water power for blowing small iron furnaces was utilized at a number of points in the Ten Mile River drainage area.

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[a] River nearly covered with ice from bank to bank, and 1½" to 2½" thick.

WATER PRIVILEGES ON TEN MILE RIVER AND TRIBUTARIES.[a]

Number. Description.

1. At State line, abandoned about twenty-five years ago.
2. At Webatuck Saw Mill, abandoned about eight years ago.
3. Grist Mill at South Dover, 200 square miles watershed, 9 feet average fall, 75 to 100 horse power.
4. Dover Furnace, on Swamp River, abandoned about forty years ago.
5. Dover Furnace, on brook leading into Swamp River, abandoned about thirty years ago.
6. Dover Plains, Winant's dam, rough block-stone and timber crib construction, 8-foot fall, 134 square miles watershed, affords power to electric light plant and grist mill, average perhaps 100 horse power.
7. Steel Works Settlement, Amenia township, grist mill abandoned five years ago.
8. Singpak, Amenia township, abandoned thirty years ago.
9. South Amenia, grist mill, 8-foot fall, 80 square miles watershed, 20 or 30 horse power.

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[a] Report on New York's Water Supply, by John R. Freeman, 1900, page 398.

Daily Gauge Height of Ten Mile River at Dover Plains, Dutchess County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.025	4.95	4.65
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.8	4.9	4.67
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.0	4.9	4.95
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.0	4.85	5.5
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.875	4.87	6.05
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.85	4.87	5.4
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.75	4.85	5.02
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.65	4.8	4.8
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.65	4.77	4.77
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.65	4.75	6.35
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.65	4.67	6.72
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.65	4.97	6.35
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.575	5.9	6.12
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.275	5.5	6.47
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.825	5.27	11.17
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.425	5.1	9.5
17	.....	.....	.....	.....	.....	.....	.....	.....	5.0	6.175	5.05	8.15
18	.....	.....	.....	.....	.....	.....	.....	.....	5.3	5.875	5.9	7.2
19	.....	.....	.....	.....	.....	.....	.....	.....	5.0	5.625	4.87	6.85
20	.....	.....	.....	.....	.....	.....	.....	.....	4.85	5.5	4.87	6.35
21	.....	.....	.....	.....	.....	.....	.....	.....	4.8	5.475	4.85	5.95
22	.....	.....	.....	.....	.....	.....	.....	.....	4.8	5.4	4.79	5.75
23	.....	.....	.....	.....	.....	.....	.....	.....	4.7	5.35	4.75	5.92
24	.....	.....	.....	.....	.....	.....	.....	.....	4.6	5.275	4.75	5.9
25	.....	.....	.....	.....	.....	.....	.....	.....	4.575	5.2	5.2	5.95
26	.....	.....	.....	.....	.....	.....	.....	.....	4.5	5.0	5.1	6.4
27	.....	.....	.....	.....	.....	.....	.....	.....	4.55	5.025	4.9	6.47
28	.....	.....	.....	.....	.....	.....	.....	.....	4.375	5.05	4.95	6.5
29	.....	.....	.....	.....	.....	.....	.....	.....	4.775	4.975	4.85	10.7
30	.....	.....	.....	.....	.....	.....	.....	.....	5.5	4.95	4.72	12.3
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.925	.....	10.22
1902.												
1	7.7	5.4	1.433	.....	6.95	4.55	4.45	5.325	3.90	5.78	5.75	4.45
2	7.0	6.1	14.1	.....	6.95	4.5	4.25	4.875	3.83	5.85	5.50	4.48
3	6.95	6.95	*11.425	.....	6.5	4.4	4.35	4.65	3.80	5.43	5.43	4.8
4	6.1	6.075	8.35	.....	6.2	4.55	4.525	4.625	3.90	5.10	5.33	4.90
5	6.075	5.5	6.95	.....	6.05	1.79	4.375	4.525	3.83	5.30	5.30	4.73
6	6.15	5.35	5.9	5.9	5.9	4.35	4.6	4.425	3.80	5.85	5.25	4.78
7	6.1	5.1	6.25	6.125	5.75	4.25	4.625	4.65	3.88	5.38	5.08	4.8
8	5.8	5.1	6.25	6.4	5.55	4.475	4.325	4.6	3.88	5.13	5.30	4.85
9	5.65	4.95	8.9	6.8	5.35	4.55	4.40	4.45	3.95	4.90	5.0	5.13
10	5.55	4.9	10.6	7.6	5.225	4.475	4.225	4.425	4.23	4.83	4.93	5.08
11	5.6	5.1	9.15	7.1	4.95	4.3	4.2	5.675	3.95	5.00	4.83	4.85
12	5.55	5.1	8.7	6.6	4.85	4.2	4.1	5.025	3.90	6.10	4.78	4.8
13	5.375	4.8	9.1	6.3	4.85	4.725	4.15	4.95	4.10	6.43	4.83	4.8
14	5.25	6.75	8.4	6.15	4.8	4.7	3.9	4.775	4.23	5.87	4.8	4.93
15	5.25	5.25	7.7	6.1	4.8	.....	3.875	4.675	4.13	5.63	4.83	5.08
16	4.925	5.15	7.3	5.9	4.75	.....	4.3	4.225	4.03	5.43	4.73	6.15
17	4.65	5.05	8.15	5.875	4.65	.....	4.175	4.175	3.88	5.25	4.65	10.47
18	5.05	5.05	7.6	5.675	4.6	.....	3.875	4.15	3.88	5.15	.....	9.13
19	5.1	5.0	6.55	5.575	4.65	.....	4.025	4.15	4.03	5.27	4.6	8.28
20	5.05	4.85	6.125	5.45	4.675	.....	4.65	4.175	4.28	5.20	4.53	7.7
21	5.05	4.75	6.1	5.35	4.575	.....	6.975	4.25	4.33	4.90	4.55	7.74
22	11.95	4.675	6.15	5.225	4.5	4.6	7.15	4.225	4.13	4.80	4.58	11.5
23	8.1	4.4	6.2	5.125	4.4	4.375	6.35	4.10	4.15	4.75	4.55	10 65
24	6.35	4.5	6.25	5.025	4.3	4.325	5.75	4.075	4.08	4.73	4.53	8.58
25	5.8	4.65	6.05	4.95	4.3	4.15	5.675	4.075	4.05	4.65	4.58	7.95
26	5.7	5.825	5.9	4.95	5.05	4.1	5.5	3.975	4.08	4.55	4.7	7.48
27	7.8	8.45	5.85	5.3	5.3	4.5	5.3	3.925	4.65	4.60	4.93	7.05
28	7.45	9.725	7.425	5.25	5.55	4.05	5.4	3.85	6.50	7.05	4.78	.....
29	6.55	.....	7 6	5.3	5.175	4.1	5.25	3.825	7.75	7.10	4.65	.....
30	6.05	.....	......	7.0	4.8	4.7	5.65	3.8	5.98	6.37	4.53	.....
31	5.5	.....	....	.....	4.7	.....	5.25	.....	.....	6.00	....	.....

*Readings taken on new gauge from this date, datum 0.33 above former gauge.

HOUSATONIC RIVER AT GAYLORDSVILLE, CONN.

Housatonic River rises in Hancock Mountains, northwestern Berkshire county, Massachusetts. In its course to its outlet in Long Island Sound, it crosses the western end of Connecticut, and nearly the entire width of Massachusetts. It parallels, at a distance of a few miles, the eastern boundary of New York and receives the drainage from a long narrow strip of New York State extending from Hoosic River Watershed nearly to Long Island Sound.

A gauging station was established at Gaylordsville, Conn., by E. G. Paul, October 24, 1900. This station is situated three miles east of the New York State line and two miles below the mouth of Ten Mile River, the principal tributary from New York State. The location of the station may be seen on the New Milford Sheet of the Topographic Atlas of the United States Geological Survey.

River height observations are made twice each day by the gauge reader George H. Monroe. The gauge scale is 16 feet in length, divided decimally. It is attached to woodwork on the inside of the covered highway bridge, in a horizontal position. The observations are made by means of a weight suspended by a sash chain running over a pulley at the zero end of the gauge scale.

Owing to unfavorable conditions underneath the bridge, the discharge measurements are made from a cable of 200 feet span placed across the stream one and one-fourth miles below the bridge. The cable is supported on the right bank by timber shears 25 feet high, and is anchored to a large buried rock. On the left bank a sycamore tree serves as a support for the cable which is anchored to the base of a large oak. The cable station is situated at the site of the proposed storage dam for the water supply of Greater New York. The tributary drainage area above the cable is estimated from the United States Geological Survey Maps to be 1,020 square miles.

A number of undeveloped water powers of considerable magnitude exist on the Housatonic River in Connecticut. The principal facts regarding these are given by John R. Freeman as follows:[a]

Undeveloped Water Powers on Housatonic River.

LOCATION.	Tributary drainage area, square miles.	Available fall feet.
Zoar	1,532	50
Little York	1,389	12
Southville	1,219	25
New Bridge	1,206	20
Gaylordsville	998	15
Bull's Bridge	780	30
Kent Furnace	755	8
Swift Bridge	....	15
Cornwall Bridge	....	10

Current Meter Discharge Measurements of Housatonic River at Gaylordsville, Conn.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1900–1901.			
October 20, 1900	3.00	303.0	E. G. Paul.
October 24, 1900	3.10	370.0	E. G. Paul.
August 10, 1900	3.25	422.0	E. G. Paul.
August 9, 1900	3.30	450.0	E. G. Paul.
August 3, 1901	3.50	549.5	A. E. Place.
September 28, 1901	3.78	700.8	W. W. Schlecht.
September 13, 1901	4.00	911.7	A. E. Place.
October 29, 1901	4.05	951.0	W. W. Schlecht.
November 23, 1901	4.11	965.4	W. W. Schlecht.
November 13 1901	4.82	1,862.7	W. W. Schlecht
December 28, 1901	5.16	2,520.0	W. W. Schlecht.
1902.			
September 8	3.45	543	H. K. Barrows.
September 19	3.75	640	Barrows & Churchill.
August 20	3.95	835	H. K. Barrows.
August 5	4.28	983	H. K. Barrows
July 11	4.30	1,159	H. K. Barrows.
November 29	4.40	1,282	F. H. Tillinghast.
June 23	4.46	1,177	W. W. Schlecht.
November 15	4.50	1,356	F. H. Tillinghast.
October 3	5.35	2,133	P. M. Churchill.
May 3	6.10	4,459	W. W. Schlecht.
December 20	6.65	5,465	F. H. Tillinghast.
July 22	6.68	5,119	H. K. Barrows.
March 18	7.63	8,259	W. W. Schlecht.
March 4	9.9	13,601	W. W. Schlecht.

MISCELLANEOUS GAUGINGS OF HOUSATONIC RIVER.

For comparison with the current meter measurements at Gaylordsville, the following previous measurements of low water flow of the Housatonic River have been abstracted from the reports of Freeman and Porter cited above. A series of gaugings of Housatonic River at Kent, Connecticut, extending from July to October inclusive, 1878, by Horace Loomis, showed a minimum flow of 260 second-feet from 755 square miles of watershed or 0.34 second-foot per square mile. The mean daily flow from May 22 to November 1, 1878, was 460 second-feet.[a]

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[a] Descriptions of Housatonic water powers are given by Freeman in his report on New York's Water Supply, 1900, pages 398–424; also see The Housatonic River and its Tributaries, by Dwight Porter, Ph. B., 10th U. S. Census, 1880, Vol. 16, Water Power, Part 1, pp. 308–324.

In connection with the water power at Birmingham, Conn., the minimum observed flow of Housatonic River is stated by Mr. D. S. Brinsdale, Chief Engineer of the Ousatonic Power Company, to be 500 second-feet from a drainage area of 1,580 square miles, or 0.316 second-foot per square mile.

Occasional gaugings during 1881 and 1882 were made by Mr. B. H. Hull, C. E., at New Milford Falls, Connecticut. His gaugings showed the minimum flow during working hours, when pond storage at the various mills was being drawn upon, to be 916 second-feet from 1,088 square miles drainage. The minimum daily flow for twenty-four hours would be less.

Mean Daily Gauge Height of Housatonic River at Gaylordsville, Conn.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1											3.2	4.9
2											3.1	4.6
3											3.1	4.3
4											2.9	4.2
5											3.0	5.6
6											2.9	5.8
7											2.8	5.4
8											3.2	5.1
9											3.5	4.9
10											4.1	4.5
11											3.9	4.2
12											3.7	4.2
13											3.6	4.2
14											3.7	4.2
15											3.7	
16											3.7	
17											3.6	
18											3.5	
19											3.6	
20											3.7	
21											4.1	
22											4.0	
23										2.9	3.9	4.8
24										3.1	3.9	5.1
25										3.2	3.8	4.3
26										3.1	4.6	4.2
27										3.1	5.5	4.1
28										3.1	5.4	4.2
29										3.1	5.1	4.0
30										3.0	4.9	3.9
31												4.2

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[a] Report to Department of Public Works of New York city for quarter ending June 30, 1879.

Housatonic River: Bull's Falls at Bull's Bridge, Conn.

Mean Daily Gauge Height of Housatonic River at Gaylordsville, Conn.—(Continued).

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	4.40	3.20	3.30	5.30	6.20	6.20	3.60	3.50	4.30	4.30	4.00	4.00
2	4.00	3.30	3.50	5.30	6.20	6.00	3.50	3.70	4.40	4.20	4.20	4.10
3	*a*	3.30	3.60	5.30	6.40	5.70	3.80	3.50	4.70	4.50	4.00	4.20
4	*a*	3.30	3.60	6.10	6.30	5.50	3.90	3.40	4.60	4.60	3.80	4.10
5	*a*	3.10	4.10	6.60	6.00	5.80	3.70	3.30	4.60	4.40	3.70	4.00
6	4.50	3.00	3.90	6.50	5.60	5.20	4.00	3.30	4.40	4.20	4.10	4.00
7	4.50	3.40	3.90	7.30	5.50	5.20	4.00	3.90	4.40	4.00	3.80	3.90
8	4.40	3.50	3.60	8.30	5.30	5.50	3.80	4.80	4.40	3.90	3.80	3.80
9	4.20	3.40	3.50	8.00	5.20	5.50	3.80	4.40	4.00	4.00	3.80	3.90
10	4.40	3.70	7.50	*b*7.80	5.20	5.40	3.80	4.10	3.90	4.00	3.70	5.00
11	4.10	3.50	8.20	7.20	5.70	5.20	3.90	4.00	4.00	3.80	3.50	5.50
12	4.70	3.30	7.50	6.70	6.30	4.90	4.00	3.90	4.20	3.80	3.60	5.90
13	4.00	3.40	6.00	6.50	6.10	4.80	4.00	3.70	4.00	3.80	4.80	5.70
14	3.50	3.70	5.50	6.10	6.00	4.60	3.90	3.70	4.00	5.20	4.90	5.80
15	3.70	3.60	5.60	5.90	5.60	5.20	3.60	3.60	4.00	6.70	4.70	8.90
16	3.80	3.40	5.60	5.90	5.50	4.70	3.50	3.70	4.10	6.00	4.60	8.20
17	4.40	3.40	4.60	5.50	5.30	4.50	3.70	3.60	4.10	5.80	4.50	7.80
18	4.00	3.40	4.60	5.30	5.30	4.20	3.60	3.70	4.70	5.30	4.40	7.50
19	3.50	3.20	4.80	5.20	5.80	4.30	3.60	4.00	4.50	5.10	4.20	6.80
20	3.40	3.30	4.80	5.20	6.20	4.20	3.60	3.80	4.40	4.90	4.30	6.10
21	3.80	3.40	10.00	7.30	6.20	4.10	3.60	4.10	4.20	4.80	4.20	5.60
22	3.60	3.50	8.70	9.30	5.80	4.00	3.50	4.70	4.20	4.60	4.20	5.10
23	3.70	3.40	7.40	8.40	5.80	4.30	3.40	4.80	4.00	4.50	4.10	4.90
24	3.50	3.20	7.10	8.50	5.60	4.70	3.60	4.80	3.80	4.40	4.20	5.20
25	3.60	3.30	6.60	8.80	6.80	4.60	3.60	6.80	3.90	4.30	4.60	5.20
26	3.70	3.00	6.60	7.85	6.70	4.30	3.50	6.70	3.80	4.30	4.80	5.00
27	3.80	3.40	7.20	7.20	6.80	4.20	3.50	5.70	3.80	4.20	4.50	5.30
28	3.70	3.30	6.90	6.90	6.80	4.00	3.50	5.20	3.80	4.00	4.00	5.10
29	3.50	.....	6.60	7.00	6.90	4.00	3.50	4.80	3.90	4.00	4.00	6.30
30	3.50	.....	6.20	6.40	6.80	3.80	3.40	4.60	4.40	4.30	4.20	9.40
31	3.40	.....	5.80	.....	6.60	.....	3.70	4.40	.....	4.10	.....	7.60
1902.												
1	7.10	4.90	14.30	6.8	6.8	4.7	4.8	4.8	3.80	5.50	5.50	4.1
2	6.50	4.90	10.80	6.6	6.3	4.4	4.6	4.65	3.55	5.50	5.30	4.15
3	5.90	5.40	9.90	6.8	6.1	4.4	4.4	4.65	3.50	5.25	5.00	4.4
4	5.30	4.90	10.20	5.8	5.9	4.6	4.7	4.45	3.60	5.15	4.95	4.6
5	5.20	4.80	7.80	5.8	5.6	4.9	4.5	4.3	3.65	5.00	4.85	4.6
6	5.30	4.60	6.80	5.5	5.5	4.8	4.5	4.4	3.55	5.15	4.75	4.3
7	5.30	4.50	6.50	5.5	5.5	4.6	4.8	4.6	3.65	5.00	4.65	4.35
8	5.20	4.40	6.80	5.7	5.3	4.6	5.0	4.55	3.50	4.85	4.60	4.3
9	5.30	8.50	6.00	6.1	5.2	4.4	4.7	4.55	3.55	4.70	4.5	3.45
10	5.10	6.80	7.50	6.8	4.9	4.6	4.5	4.45	4.00	4.55	4.35	3.55
11	5.00	7.00	7.20	6.9	5.0	4.5	4.35	4.5	4.00	4.40	4.3	3.7
12	4.90	8.00	7.70	6.8	4.9	4.5	4.3	5.15	3.90	5.30	4.45	3.75
13	4.70	8.80	7.80	6.8	4.9	4.4	4.2	5.0	3.85	5.30	4.4	4.0
14	4.30	8.30	8.00	6.7	4.8	4.7	4.0	4.7	4.10	5.10	4.5	4.05
15	4.50	8.00	7.90	6.2	4.7	4.6	3.9	4.5	4.00	5.00	4.5	4.25
16	4.50	7.10	7.7	5.9	4.6	4.3	4.1	4.35	3.60	4.80	4.4	4.90
17	4.30	6.80	7.9	5.8	4.6	4.5	4.2	4.2	3.70	4.75	4.35	7.9
18	4.20	7.00	7.6	5.6	4.5	4.4	3.9	4.0	3.75	4.60	4.25	7.35
19	4.40	7.50	7.3	5.6	4.4	4.4	3.8	3.8	3.80	4.55	4.3	6.7
20	4.20	7.30	7.0	5.5	4.3	4.4	4.65	4.05	3.85	4.25	4.25	6.35
21	4.50	7.20	6.6	5.2	4.6	4.3	6.0	3.95	4.05	4.30	4.3	6.65
22	8.50	7.20	6.6	5.2	4.4	4.7	6.6	4.05	3.75	4.45	4.2	8.6
23	6.80	6.80	6.1	5.1	4.3	4.5	6.0	4.1	3.60	4.40	4.0	8.4
24	6.30	6.50	5.9	5.1	4.1	4.3	5.7	4.1	3.70	4.45	4.05	7.55
25	5.80	6.80	6.0	5.0	4.2	4.3	5.5	3.95	3.65	4.45	4.15	7.3
26	5.60	7.00	6.0	4.9	4.5	4.3	5.3	3.95	3.85	4.40	4.25	6.9
27	5.90	10.60	5.9	5.0	4.6	4.2	4.95	3.95	4.20	4.30	4.6	6.65
28	5.70	9.00	5.9	5.1	5.3	4.2	4.85	3.95	4.60	5.85	4.5	6.0
29	5.30	.....	6.7	5.1	5.3	4.1	5.55	3.9	6.30	6.55	4.4	5.75
30	4.90	.....	6.7	6.2	5.0	4.3	5.45	3.9	6.00	6.00	4.25	5.9
31	4.90	.....	6.7	.....	5.7	.....	5.4	.....	.....	5.80	.....	5.6

a Frozen. *b* Ice went out.

Estimated Low Water Flow of Housatonic River at Gaylordsville, Conn.
[Drainage area, 1,020 square miles.]

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	395	1,970
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	355	1,545
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	355	1,180
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*a*	1,075
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	315	*a*
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*a*	.....
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	395	.....
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	1,970
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	980	1,410
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	810	1,075
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	670	1,075
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	605	1,075
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	670	1,075
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	670	*a*
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	670	.....
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	605	.....
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	.....
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	605	.....
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	670	.....
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	980	.....
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	890	.....
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	810	1,820
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	355	810	*a*
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	395	740	1,180
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	355	1,545	1,075
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	355	*a*	980
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	355	.....	1,075
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	355	.....	890
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	315	1,970	810
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	*a*	.....	1,075
1901.												
1	1,290	395	450	*a*	*a*	*a*	605	550	1,180	1,180	890	*b*
2	1,290	450	550	.....	.....	.....	550	670	1,290	1,075	1,075	.....
3	*b*	450	605	.....	.....	.....	740	550	1,680	1,410	890	.....
4	.....	450	605	.....	.....	.....	810	500	1,545	1,545	740	.....
5	.....	355	980	.....	.....	.....	670	450	1,545	1,290	670	980
6	1,410	315	810	.....	.....	.....	890	450	1,290	1,075	980	890
7	1,410	500	810	.....	.....	.....	890	810	1,290	890	740	810
8	1,290	550	605	.....	.....	.....	740	1,820	1,290	810	740	.....
9	1,290	500	550	.....	.....	.....	740	1,290	890	890	740	.....
10	1,290	670	*a*	.....	.....	.....	740	980	810	890	670	.....
11	980	550	.....	.....	.....	.....	810	890	890	740	550	.....
12	1,680	450	.....	.....	.....	.....	890	810	1,075	740	605	.....
13	890	500	.....	.....	.....	1,820	890	670	890	740	1,820	.....
14	550	670	.....	.....	.....	1,545	810	670	890	*a*	1,970	.....
15	670	605	.....	.....	.....	.....	605	605	890	.....	1,680	.....
16	740	500	.....	.....	.....	1,680	550	670	980	.....	1,545	.....
17	1,290	500	.....	.....	.....	1,410	670	605	980	.....	1,410	.....
18	890	500	.....	.....	.....	1,075	605	670	1,680	.....	1,290	.....
19	550	395	.....	.....	.....	1,180	605	890	1,410	.....	1,075	.....
20	500	450	.....	.....	.....	1,075	605	740	1,290	1,970	1,180	.....
21	740	500	.....	.....	.....	980	605	980	1,075	1,820	1,075	.....
22	605	550	.....	.....	.....	890	550	1,680	1,075	1,545	1,075	.....
23	670	500	.....	.....	.....	1,180	500	1,820	890	1,410	980	.....
24	550	395	.....	.....	.....	1,680	605	1,820	740	1,290	1,075	.....
25	605	450	.....	.....	.....	1,545	605	*a*	810	1,180	1,545	.....
26	670	315	.....	.....	.....	1,180	550	.....	740	1,180	1,820	.....
27	740	500	.....	.....	.....	1,075	550	.....	740	1,075	1,410	.....
28	670	450	.....	.....	.....	890	550	.....	740	890	890	.....
29	550	.....	.....	.....	.....	890	550	1,820	810	890	890	.....
30	550	.....	.....	.....	.....	740	500	1,545	1,290	1,180	1,075	.....
31	500	.....	.....	.....	.....	.....	670	1,290	.....	980	.....	.....

a Discharge exceeds limit of rating curve. *b* No record.

SUSQUEHANNA RIVER DRAINAGE.

CHENANGO RIVER AT BINGHAMTON, BROOME COUNTY, N. Y.

The gauge on this stream is located on the upstream side of the first span from the right bank of Court Street Highway bridge in Binghamton.

It consists of a horizontal wooden box containing a scale graduated in feet and tenths to 15.5 feet, secured to the vertical supports of the hand railing by means of U-bolts. At the zero end of the scale is placed a pulley over which passes the weight wire. The bench mark is a circular chisel draft in upstream corner of bridge seat on left-hand abutment.

Elevation of bench mark............................	100.00
Elevation of water surface when gauge reads zero....	65.98

The Court Street Bridge stands squarely across the thread line of the stream, which has a nearly horizontal bed of gravel and small cobblestones, affording a smooth uniform current for gauging. The channel is obstructed by three masonry piers supporting the four spans of the bridge, 79 feet clear width each; the bridge having a total length of 337 feet between abutments. The bridge is situated 2,500 feet above the mouth of Chenango River. A small rift below the bridge cuts off backwater from Susquehanna River at ordinary stages of the rivers. During freshets, when the gauge reading may be affected by backwater, making them appear too large, check readings are taken at De Forest Street Bridge 1.4 miles upstream.

During 1901 nine current meter measurements have been made through the co-operation of E. C. Murphy as follows:

DATE.	Gauge height, feet.	Discharge, second-feet.
1901.		
July 29	5.21	405
July 29	5.21	425
August 19	5.48	566
August 19	5.49	577
July 2	5.64	848
July 9	5.71	942
July 8	5.78	1,119
October 19	5.81	a987
October 19	5.82	a927

a Subject to revision.

Current Meter Discharge Measurements of Chenango River at Binghamton, N. Y.

DATE.	Gauge height, feet.	Discharge, second-feet.	Hydrographer.
1902.			
August 15	6.08	1,341	E. C. Murphy.
August 14	6.20	1,605	E. C. Murphy.
July 15	6.56	2,098	E. C. Murphy.
June 6	6.58	2,407	R. E. Horton.
July 3	7.16	2,688	E. C. Murphy.
March 27	8.15	4,201	E. C. Murphy.
March 28	8.21	4,377	E. C. Murphy.
July 1	8.41	4,815	E. C. Murphy.
March 29	8.75	5,205	E. C. Murphy.
August 3	9.04	5,543	E. C. Murphy.

The gauge reader, Mr. E. F. Weeks, takes readings of the river stage twice daily. During freshets additional readings are taken at frequent intervals at the Chenango and Susquehanna stations by the United States Weather Bureau, of which Mr. W. E. Donalson is official in charge at Binghamton.

Three-fourths mile above the gauge is located the dam of the Binghamton Cold Storage Company. Six water wheels are used under a head varying from zero to 5 feet, rated at a total of 150 horse power. The dam is a low structure giving but 3 feet fall. It consists of large blocks of bluestone laid dry, offering numerous leaks and crevices. The dam affords little obstruction to the flow of the stream, which passes the gauge in nearly its normal regimen.[a]

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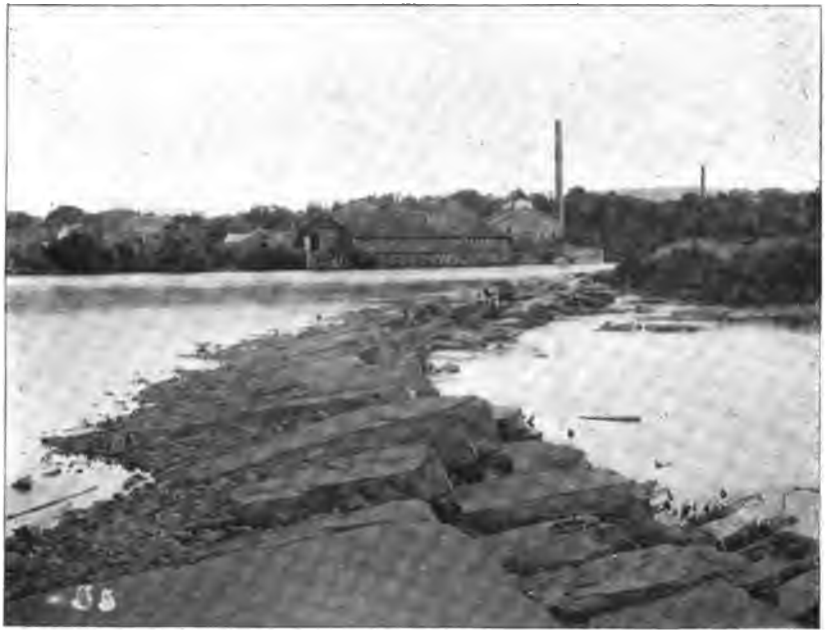
[a] See description of Chenango River in Report on Water Power, Pt. 1, 10th U. S. Census, 1880 Vol. XVI, pp. 583-585.


Chenango River: Dam at Binghamton, N. Y., 1902.

The flow at Binghamton does not represent the entire natural run-off of the Chenango Watershed, as a portion of the headwaters are diverted across the Chenango-Mohawk divide through Oriskany Creek, to feed the Rome or summit level of Erie Canal.[b] Additional diversion takes place from the headwaters of Tioughnioga River through Fayetteville feeder. De Ruyter Reservoir, at the head of the feeder, which has a tributary drainage of 18 square miles, receives most of its supply from across the Chenango divide.

NOMINAL AND EFFECTIVE DRAINAGE AREAS OF CHENANGO RIVER ABOVE BINGHAMTON.

Natural drainage area above Binghamton...	1,582 square miles
Area tributary to canal storage reservoirs...	105 square miles
Effective area above Binghamton during navigation season	1,477 square miles

Mean Monthly Flow of Chenango River at Binghamton, Broome County, N. Y., Low Water Season of 1901.

[Drainage area, 1,582 square miles.]

MONTH.	Second-feet.	Second-feet per square mile.	Inches on drainage area.
August	507	0.32	0.37
September	546	0.34	0.38
October	682	0.37	0.43
November	....	....	....
December	....	....	....

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[b] See description of Oriskany Creek Station, p. 121.

Mean Daily Gauge Height of Chenango River at Binghamton, Broome County, N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	....	....	....	....	....	....	....	5.18	5.58	5.70	5.46	6.12
2	....	....	....	....	....	....	....	5.08	5.75	5.50	5.31	6.33
3	....	....	....	....	....	....	....	5.10	5.58	5.52	5.26	6.61
4	....	....	....	....	....	....	....	5.10	5.50	5.68	5.28	6.52
5	....	....	....	....	....	....	....	5.05	5.43	5.55	5.27	6.19
6	....	....	....	....	....	....	....	5.20	5.28	5.51	5.25	5.95
7	....	....	....	....	....	....	....	5.01	5.23	5.45	5.25	5.91
8	....	....	....	....	....	....	....	5.10	5.20	5.47	5.23	6.03
9	....	....	....	....	....	....	....	5.20	5.18	5.40	5.24	6.85
10	....	....	....	....	....	....	....	5.20	5.15	5.37	5.21	9.64
11	....	....	....	....	....	....	....	5.23	5.15	5.34	5.14	10.00
12	....	....	....	....	....	....	....	5.20	5.18	5.34	5.26	8.82
13	....	....	....	....	....	....	....	5.18	5.30	5.42	6.85	....
14	....	....	....	....	....	....	....	5.13	5.48	6.47	6.45	8.48
15	....	....	....	....	....	....	....	5.15	5.35	6.41	6.20	10.54
16	....	....	....	....	....	....	....	6.35	5.43	6.08	6.11	18.02
17	....	....	....	....	....	....	....	5.90	5.55	5.89	6.10	12.61
18	....	....	....	....	....	....	....	5.60	5.63	5.85	6.06	9.42
19	....	....	....	....	....	....	....	5.48	5.55	5.80	6.06	8.11
20	....	....	....	....	....	....	....	5.40	5.45	5.82	6.00	7.40
21	....	....	....	....	....	....	....	5.55	5.45	5.78	5.96	6.84
22	....	....	....	....	....	....	....	5.58	5.30	5.75	5.95	6.67
23	....	....	....	....	....	....	....	5.48	5.23	5.70	5.94	6.77
24	....	....	....	....	....	....	....	6.70	5.20	5.67	6.72	8.18
25	....	....	....	....	....	....	....	6.20	5.25	5.57	7.78	7.42
26	....	....	....	....	....	....	....	5.65	5.24	5.48	7.19	6.89
27	....	....	....	....	....	....	....	5.38	5.25	5.45	6.64	6.84
28	....	....	....	....	....	....	....	5.30	.....	5.39	6.06	6.50
29	....	....	....	....	....	....	....	5.25	5.15	5.40	6.20	6.53
30	....	....	....	....	....	....	....	5.20	5.88	5.35	6.33	7.20
31	....	....	....	....	....	....	....	5.20	.....	5.39	.....	7.36
1902.												
1	6.62	6.31	19.44	8.65	6.53	6.20	8.50	8.33	6.03	7.73	8.48	6.98
2	6.64	6.26	23.32	8.61	6.30	6.03	7.80	9.33	5.98	7.70	8.00	6.93
3	6.74	6.13	21.64	8.45	6.20	5.95	7.31	8.35	6.00	7.13	7.70	7.13
4	6.91	6.34	17.15	8.10	6.20	6.23	7.35	7.70	5.93	6.73	7.43	7.68
5	6.65	6.20	12.30	7.83	6.20	6.95	7.05	7.20	5.90	6.48	7.28	7.58
6	6.61	6.19	9.93	.....	6.10	6.58	7.38	6.88	5.88	6.73	7.18	7.18
7	6.52	6.16	9.25	7.60	6.10	6.30	8.12	6.90	5.93	7.00	7.15	7.05
8	6.30	6 20	9.03	7.57	6.10	6.30	7.93	6.75	5.90	6.88	7.03	6.95
9	6.22	6.21	8.67	8.12	6.10	6.33	7.73	6.68	5.93	6.90	6.88	6.70
10	6.13	6.08	9.45	8.50	5.98	6.30	7.80	6.45	6.30	6.75	6.78	6.63
11	6.14	6.10	9.28	8.97	5.95	8.45	9.15	6.40	6.53	6.58	6.73	7.00
12	6.02	5.99	11.60	8.78	5.90	6.33	8.33	6.65	6.25	6.60	6.68	6.98
13	5.87	5.90	15.08	8.48	5.85	6.25	7.33	6.60	6.10	6.60	6.93	6.68
14	5.63	5.84	15.77	8.23	5.80	6.30	6.88	6.29	6 05	6.80	6.85	6.45
15	5.89	5.77	14.17	7.80	5.75	6.20	6.60	6.13	6.00	7.08	6.75	6.55
16	5.91	5.87	11.97	7.43	5.70	6.18	6.48	6.10	5.90	6.75	6.60	6.99
17	5.89	5.76	15.87	7.18	5.73	6.20	6.48	5.98	5.85	6.55	6.55	10.97
18	5.76	5.78	15.72	7.05	5.70	6.10	6.40	5.93	5.80	6.45	6.53	11.38
19	5.78	5.74	13.10	6.90	5.60	6.00	6.73	5.88	5.80	6.40	6.50	10.35
20	5.78	5.71	10.47	6.80	5.75	6.00	11.57	5.88	5.75	7.25	6.55	9.53
21	5.67	5.64	9.40	6.70	6.00	5.95	14.98	6.15	5.73	7.30	6.50	8.95
22	6.02	5.67	9.20	6.63	5.88	6.20	14.90	6.44	5.70	6.95	6.53	13.29
23	8.24	5.68	9.32	6.50	5.78	6.25	13.40	6.35	5.75	6.78	6.53	14.47
24	8.66	5.67	9.38	6.38	5.83	6.08	12.22	6.33	5.73	6.75	6.60	11.72
25	7.62	5.69	8.90	6.30	5.95	5.93	11.35	6.28	5.75	6.75	6.65	9.75
26	6.87	5.73	8.47	6.18	6.30	5.98	9.60	6.25	5.98	6.65	6.73	9.15
27	6.86	6.08	8.15	6.18	6.58	6.10	8.50	6.15	6.20	6.60	7.23	8.68
28	7.28	8.42	8.15	6.13	6.30	6.08	11.50	6.23	6.10	10.19	7.50	8.08
29	7.39	.....	8.90	6.13	6.20	6.65	9.58	6.18	8.08	12.15	7.23	7.68
30	6.86	.....	9.28	6.28	6.18	10.48	8.50	6.18	6.88	10.85	7.05	7.73
31	6.41	.....	8.97	.....	6.15	......	9.18	6.10	.....	9.30	.....	7.43

SUSQUEHANNA RIVER AT BINGHAMTON, BROOME COUNTY, N. Y.

A gauging station was established on this stream July 31, 1901. The gauge is located on the upstream side of the left span of the Washington Street Highway bridge. This bridge is situated about 800 feet upstream from the junction of Chenango and Susquehanna Rivers. A rift extends diagonally across the stream, underneath the bridge. The gauge stands above a stretch of smooth water extending from the crest of the rift to the dam, 2,800 feet upstream, and the gauge readings are unaffected by backwater from Chenango River at ordinary stages. Owing to unfavorable conditions underneath the Washington Street bridge, discharge measurements are made at Exchange Street bridge, 1,900 feet upstream. The gauge is of the weight and wire variety, reading to feet and tenths. Its datum being determined as follows:

Bench mark, chisel draft on corner left-hand bridge abutment, upstream side, elevation...............	100.00
Elevation water surface, when gauge reads zero[a]...	75.88

Current meter measurements were made during 1901 and 1902 by E. C. Murphy, as follows:

Current Meter Discharge Measurements of Susquehanna River at Binghamton, Broome Co., N. Y.

DATE.	Gauge height, feet.	Discharge second-feet.	Hydrographer.
1901.			
July 30	1.99	608	E. C. Murphy
August 20	2.09	942	
August 20	2.10	689	
July 3	2.12	947	
July 10	2.35	1,425	
August 23	2.64	2,176	
August 22	2.94	2,983	
August 22	3.23	3,752	
August 21	4.64	7,244	
1902.			
August 16	2.50	1,920	
August 15	2.61	2,105	
July 14	2.96	3,064	
July 4	3.90	5,230	
July 2	4.08	5,839	
August 4	4.59	6,902	
August 3	5.08	8,633	

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[a] No. 100 original gauge.

By plotting the above discharges as absissae, using the gauge heights as ordinates, a rating curve for the stream cross section at Binghamton has been prepared, from which the mean daily flow in second-feet has been determined from the mean daily gauge height. The gauge is read twice daily by Mr. E. F. Weeks.

There are no tributaries of noticeable magnitude entering between the gauging stations on the Chenango and Susquehanna Rivers at Binghamton and the junction of the two streams. Simultaneous discharge measurements of the two streams were made on several occasions. By combining the volumes of flow of the two branches, that of the Susquehanna below the junction at Binghamton has been obtained as follows:[a]

DATE.	Total flow below junction, second-feet.
1901.	
July 2-3	1,795
July 8-10	2,544
July 29-30	1,013
August 19-20	1,519
August 19-20	1,518

An additional measurement made at the highway bridge Union, N. Y., by R. E. Horton June 6, 1902, showed a discharge of 5,475 second-feet. Elevation of water surface referred to D., L. & W. R. R. datum 803.88. The drainage area at Union is 4,032 square miles. The accompanying tables show the stage and progress of the floods of December 15-16, 1901, and March 1-2, 1902; the latter exceeded all known previous floods except that of 1865. The following comparative data has been obtained from these two floods at Binghamton and at Union highway bridge 8.8 miles below the gauging station. Elevations were referred to the D., L. & W. R. R. datum or mean tide at Sandy Hook.

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[a] See description, Chenango River, p. 309.

FLOOD.	Elevation at Binghamton.	Elevation at Union.	Fall in feet.
December 15–16, 1901	835.67	820.59	15.08
March 1–2, 1902	839.77	826.71	13.06
1865	840.00	827.82	12.18

From the stage and slope as given above and from cross-sections obtained, the discharge during these freshets has been calculated by means of the Kutter formula. The coefficient of roughness n= .040 has been used, this value having been calculated from observed slopes and measured discharges at lower stages of the stream.

FLOOD.	Estimated discharge second-feet.	Second-feet per square mile.
December 15–16, 1901	67,160	16.7
March 1–2, 1902	104,470	25.9
1865	104,770	26.0

Flood of December 15–16, 1901, *at Binghamton, N. Y.*

SUSQUEHANNA RIVER.			CHENANGO RIVER.		
Date.	Time.	Gauge.	Date.	Time.	Gauge.
Dec. 15	8:45 A. M.	14.44	Dec. 15	9:10 A. M.	18.73
	12:30 P. M.	14.94		11:00 A. M.	19.45
	5:30 P. M.	15.64		5:00 P. M.	20.45
Dec. 16	8:00 A. M.	14.59	Dec. 16	7:30 A. M.	18.63
	11:00 A. M.	14.19		11:30 A. M.	17.90
	4:30 P. M.	12.89		5:00 P. M.	16.50
Dec. 17	7:50 A. M.	10.29	Dec. 17	7:20 A. M.	13.73
				2:45 P. M.	12.20
				4:50 P. M.	11.90

Flood of March 1-2, 1902, at Binghamton, N. Y.

SUSQUEHANNA RIVER.			CHENANGO RIVER.		
Date.	Time.	Gauge.	Date.	Time.	Gauge.
Feb. 28..........	7:35 A. M.	3.54a	Feb. 28........	7:15 A. M.	5.95
	2:00 P. M.	5.44		1:20 P. M.	8.50
	4:30 P. M.	7.84		5:00 P. M.	11.32
March 1..........	7:25 A. M.	13.79	March 1.......	7:05 A. M.	17.38
	9:00 A. M.	14.09		8:45 A. M.	17.80
	10:50 A. M.	14.49		10:40 A. M.	18.10
	1:30 P. M.	14.99		1:05 P. M.	18.60
	3:10 P. M.	15.19		3:00 P. M.	19.10
	5:00 P. M.	16.54		4:00 P. M.	20.10
	7:20 P. M.	17.59		7:30 P. M.	21.50
March 2..........	7:40 A. M.	19.74	March 2.......	8:00 A. M.	22.80
	10:30 A. M.	18.69		11:00 A. M.	22.60
	1:55 P. M.	18.79		1:35 P. M.	22.60
	4:00 P. M.	18.79		4 :20 P. M.	22.70
	7:35 P. M.	18.90		8:20 P. M.	22.90
March 3..........	7:55 A. M.	18.69		10:30 P. M.	23.10
	9:15 A. M.	18.39	March 3.......	7:30 A. M.	22.50
	1:30 P. M.	17.99		9:00 A. M.	22.30
	7:30 P. M.	16.99		11:30 A. M.	21.95
March 4..........	7:20 A. M.	14.89		1:00 P. M.	21.70
	1:15 P. M.	13.74		3:40 P. M.	21.40
	3:15 P. M.	13.34		7:00 P. M.	20.80
	5:00 P. M.	12.99	March 4.......	7:00 A. M.	18.40
March 5..........	7:45 A. M.	10.19		12 :00 A. M.	17.30
	5:00 P. M.	8.49		3:25 P. M.	16.60
March 6..........	7:55 A. M.	6.79		5:30 P. M.	16.30
	4:45 P. M.	6.24	March 5.......	7:00 A. M.	13.65
				4:30 P. M.	11.95
			March 6.......	7:30 A. M.	10.25

The drainage area of the Susquehanna above Binghamton has been estimated as below:

Drainage Areas of Susquehanna and Chenango Rivers.

LOCATION.	Square miles.
Susquehanna above Oneonta..	686
Susquehanna above mouth Unadilla River..................................	914
Unadilla River above junction with Susquehanna..............................	565
Susquehanna River below mouth Unadilla River..............................	1,479
Susquehanna River, total drainage in New York above Chenango River...........	1,900
Susquehanna River, drainage in Pennsylvania above Chenango River.............	500
Susquehanna River, total above Chenango River..............................	2,400
Chenango River above Chenango Forks......................................	694
Tioughnioga River above junction with Chenango River.......................	753
Chenango River below mouth Tioughnioga River	1,447
Chenango River above mouth..	1,582
Susquehanna River below junction of Chenango River..........................	3,982

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a Readings as taken on No. 2 gauge were 0.41 greater; as here given they have been reduced to original or No. 1 Datum.

The Susquehanna gauge is located a short distance below the Binghamton Water Power dam, and the record shows the amount passed by the turbines or wasting over spillway each day. The dam was built in 1833 by Whitney and Waterman. In 1869 it was repaired and its crest raised by the State of New York, and it now furnishes water power to four mills under an effective head of 6 feet.[a]

Water Power Privileges at Susquehanna River Dam, Binghamton, Broome County, N. Y.

FIRM.	Business.	Water rights, etc.
H. J. Lyons Sons	Saw and planing mill	First privilege, unlimited.
Luke Doolittle	Custom grinding	For one reaction water wheel.
Binghamton Box Co.	Cigar boxes	Specified number of square inches.
Wilkerson Mfg. Co.	Novelty Works	Specified number of square inches.

By taking levels of high-water marks furnished by the mill owners, the following data relative to flood discharge of Susquehanna River has been obtained.

DATE.	Depth on crest of present dam.	Estimated discharge, second-feet.
March, 1865	13.8	....
Highest since 1865	9.0	41,000
1898 and 1899	8.5	38,000
1901	7.4	38,000

Gauging stations of United States Geological Survey are located on Susquehanna River below Binghamton as follows:[b]

LOCATION OF STATION.	Date when established.
East Branch Susquehanna River at Binghamton, N. Y.	July 31, 1901
East Branch Susquehanna River at Wilkesbarre, Penn	March 30, 1899
East Branch Susquehanna River at Danville, Pa.	March 25, 1899
West Branch Susquehanna River at Allentown, Pa.	March 23, 1899
Juniata River at Newport, Pa.	March 21, 1899
Susquehanna River at Harrisburg, Pa.	——— 1890

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[a] For description Susquehanna River Water Power, see Report on Water Power, Pt. 1, 10th U. S. Census, vol. XVI., pp. 577-583.

[b] For results of gaugings, see Annual Reports and Water Supply and Irrigation Papers, U. S Geol. Survey.

Daily Gauge Height of Susquehanna River at Binghamton, Broome County, N. Y.

DAY.	Jan.	Feb.	Mar.	Ap.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1901.												
1	.....	.....	.....	.....	.....	.....	.....	1.87½	2.25	2.75	2.6	3.05
2	.....	.....	.....	.....	.....	.....	.....	2.0	2.2	2.75	2.57	3.05
3	.....	.....	.....	.....	.....	.....	.....	1.95	2.2	2.72½	2.5	3.2
4	.....	.....	.....	.....	.....	.....	.....	1.9	2.25	2.72½	2.5	3.12
5	.....	.....	.....	.....	.....	.....	.....	1.9	2.22½	2.7	2.52	3.2
6	.....	.....	.....	.....	.....	.....	.....	1.9	2.2	2.62½	2.5	3.0
7	.....	.....	.....	.....	.....	.....	.....	1.9	2.1	2.6	2.5	2.88
8	.....	.....	.....	.....	.....	.....	.....	1.95	2.07½	2.55	2.5	2.9
9	.....	.....	.....	.....	.....	.....	.....	1.95	2.07½	2.6	2.47	3.0
10	.....	.....	.....	.....	.....	.....	.....	1.9	2.0	2.55	2.5	5.76
11	.....	.....	.....	.....	.....	.....	.....	1.97½	2.02½	2.57½	2.47	6.68
12	.....	.....	.....	.....	.....	.....	.....	1.97½	2.1	2.52½	2.52	5.88
13	.....	.....	.....	.....	.....	.....	.....	1.95	2.07½	2.55	3.05	.....
14	.....	.....	.....	.....	.....	.....	.....	2.0	2.05	2.62½	3.52	5.18
15	.....	.....	.....	.....	.....	.....	.....	1.97½	2.12½	2.7	3.35	15.42
16	.....	.....	.....	.....	.....	.....	.....	1.97½	2.2	2.87½	3.10	14.3
17	.....	.....	.....	.....	.....	.....	.....	2.0	2.25	2.95	3.0	9.8
18	.....	.....	.....	.....	.....	.....	.....	2.15	2.4	.....	2.98	6.22
19	.....	.....	.....	.....	.....	.....	.....	2.2	2.4	2.82½	2.92	4.85
20	.....	.....	.....	.....	.....	.....	.....	2.1	2.37½	2.8	2.95	3.05
21	.....	.....	.....	.....	.....	.....	.....	3.7	2.27½	2.8	2.95	3.52
22	.....	.....	.....	.....	.....	.....	.....	3.02½	2.2	2.82½	2.88	3.32
23	.....	.....	.....	.....	.....	.....	.....	2.65	2.1	2.8	2.85	4 3
24	.....	.....	.....	.....	.....	.....	.....	4.55	2.1	2.75	3.28	5.22
25	.....	.....	.....	.....	.....	.....	.....	3.9	2.1	2.7	3.98	4.52
26	.....	.....	.....	.....	.....	.....	.....	3.25	2.07½	2.65	3.5	3.88
27	.....	.....	.....	.....	.....	.....	.....	2.82½	2.3	2.42½	3.08	3.88
28	.....	.....	.....	.....	.....	.....	.....	2.5	.....	2.62½	2.8	3.42
29	.....	.....	.....	.....	.....	.....	.....	2.4	2.57½	2.6	2.9	3.45
30	.....	.....	.....	.....	.....	.....	.....	2.3	2.6	2.6	2.95	3.25
31	.....	.....	.....	.....	.....	.....	1.95	2.35	.....	2.62½	.....	4.62
1902.												
1	3.78	3.10	16.10	5.95	3.60	3.10	5.85	5.65	2.88	5.33	5.35	3.50
2	3.95	3.10	19.39	5.85	3.60	3.13	4.98	6.68	2.88	5.00	4.83	3.48
3	3.78	3.13	18.39	5.62	3.50	3.05	4.35	6.02	2.88	4.43	4.45	3.60
4	4.13	3.80	14.26	5.30	3.40	3.38	4.63	5.25	2.90	4.10	4.23	3.85
5	3.78	3.53	9.75	4.95	3.40	3.83	4.18	4.53	2.88	3.65	4.03	4.08
6	3.70	3.23	6.92	.....	3.43	3.60	4.73	4.20	2.83	3.68	3.88	3.93
7	3.58	3.28	6.15	4.65	3.33	3.38	5.18	4.13	2.80	3.58	3.83	3.68
8	3.38	3.30	5.90	4.58	3.28	3.33	5.10	3.85	2.85	3.53	3.75	3.53
9	3.23	3.35	5.60	5.50	3.20	3.40	4.75	3.73	2.83	3.50	3.58	3.48
10	3.10	3.28	6.30	6.15	3.20	3.35	4.78	3.58	3.00	3.43	3.53	3.60
11	3.08	3.40	6.15	6.45	3.10	3.23	5.53	3.48	3.00	3.30	3.45	3.58
12	3.25	3.20	8.37	6.20	3.08	3.23	5.13	3.50	3.00	3.43	3.40	3.70
13	3.13	2.98	11.75	5.78	3.05	3.33	4.18	3.55	2.98	3.53	3.40	3.58
14	3.03	2.90	12.50	5.45	3.05	3.33	3.53	3.50	2.90	3.65	3.50	3.43
15	2.90	2.80	11.17	5.10	3.03	3.40	3.50	3.35	2.90	3.65	3.43	3.50
16	2.88	2.88	8.98	4.73	3.00	3.40	3.45	3.24	2.85	3.63	3.30	3.69
17	2.80	2.75	18.57	4.45	3.00	3.28	3.38	3.15	2.80	3.50	3.30	7.89
18	2.78	2.70	12.43	4.28	2.90	3.30	3.40	3.10	2.80	3.35	3.28	8.40
19	2.98	2.73	10.02	4.13	2.90	3.25	3.40	3.05	2.80	3.25	3.23	7.45
20	3.20	2.73	7.38	3.93	2.90	3.25	7.53	3.05	2.75	3.35	3.25	6.63
21	2.70	2.75	6.27	3.83	3.00	3.20	11.80	3.10	2.70	3.50	3.20	6.03
22	3.13	2.68	6.05	3.73	3.08	3.23	12.10	3.10	2.70	3.48	3.20	10.20
23	5.33	2.88	6.17	3.60	3.10	3.33	10.75	3.03	2.75	3.33	3.23	11.37
24	5.73	2.85	6.32	3.43	3.00	3.25	9.65	3.03	2.73	3.28	3.20	8.95
25	4.78	2.73	6.00	3.38	2.95	3.13	8.85	3.00	2.75	3.28	3.23	7.03
26	3.95	2.68	5.47	3.30	3.13	3.03	7.12	3.00	3.10	3.25	3.28	6.38
27	3.70	2.98	5.12	3.25	3.30	3.13	6.15	2.95	3.38	3.20	3.45	5.73
28	4.23	5.50	5.00	3.28	3.28	3.13	8.27	3.00	3.30	7.10	3.60	5.23
29	4.58	.....	6.05	3.28	3.23	3.60	6.60	3.03	5.75	9.05	3.65	4.70
30	3.90	.....	6.45	3.35	3.15	3.68	5.55	3.03	4.55	7.90	3.58	4.55
31	3.43	.....	6.27	.....	3.10	.....	6.15	2.93	.....	6.28	.....	4.38

DELAWARE RIVER DRAINAGE.

WEST BRANCH DELAWARE RIVER AT HANCOCK, DELAWARE COUNTY, NEW YORK.

The Delaware River originates on the slope of Mine Mountain near the southwestern line of Schoharie County, flows southwesterly across central Delaware County to Deposit, where it is joined by Oquaga Creek, a large tributary draining eastern Broome County. The upper drainage area is relatively long and narrow, with numerous short lateral tributaries. It is precipitous, and to a considerable extent wooded. There are low-water power dams near Hamden and Delhi. At Deposit, the stream turns abruptly to the southeast, forming the boundary line between New York and Pennsylvania until Port Jervis is reached. Here it encounters the foot of the Shawangunk Range, and its direction of flow is again turned to the southwest. Below Port Jervis, the Delaware forms the division between Pennsylvania and New Jersey, and ultimately debouches into Delaware Bay below Philadelphia. Above Hancock, the main stream is known as the West Branch of Delaware River,[a] to distinguish it from the smaller East or Pepacton branch of Delaware River.

The gauging station on West Branch Delaware River is situated at the suspension bridge in Hancock Village. A weight and wire gauge, reading decimally to fifteen feet, is attached to the upstream side of the bridge. The stream bed is of rock, overlaid with gravel and cobblestone.

The bench mark is a circular chisel draft on the upstream corner of the left-hand abutment.

Elevation bench mark	100.00
Elevation of water surface when gauge reads zero	75.75

The gauge was erected October 15, 1902, by P. M. Churchill and C. C. Covert.

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[a] Sometimes called Mohawk. It should not be confused with the Mohawk River, a tributary of Hudson River.

The gauge is read each day at 8 a. m. and again at 4 p. m. by David Pulver, collector of tolls at the bridge.

The gauging station is situated approximately one-half mile upstream from the junction of the East and West branches of the stream. The bridge has a span between abutments of 235 feet. The bridge is spaced in five-foot intervals on the downstream side, beginning at face of left-hand abutment. Discharge measurements are made from the lower side of the bridge.

Mean Daily Gauge Height of West Branch Delaware River at Hancock, Delaware Co., N. Y.

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	....	....	....	....	....	....	....	....	....	....	4.55	3.0
2	....	....	....	....	....	....	....	....	....	....	4.33	2.98
3	....	....	....	....	....	....	....	....	....	....	4.33	3.25
4	....	....	....	....	....	....	....	....	....	....	4.43	3.30
5	....	....	....	....	....	....	....	....	....	....	3.75	3.25
6	....	....	....	....	....	....	....	....	....	....	3.75	3.25
7	....	....	....	....	....	....	....	....	....	....	3.53	3.25
8	....	....	....	....	....	....	....	....	....	....	3.35	3.28
9	....	....	....	....	....	....	....	....	....	....	3.32	3.03
10	....	....	....	....	....	....	....	....	....	....	3.25	3.20
11	....	....	....	....	....	....	....	....	....	....	3.15	3.75
12	....	....	....	....	....	....	....	....	....	....	3.30	3.70
13	....	....	....	....	....	....	....	....	....	....	3.20	3.85
14	....	....	....	....	....	....	....	....	....	....	3.20	3.8
15	....	....	....	....	....	....	....	....	....	3.90	3.07	3.90
16	....	....	....	....	....	....	....	....	....	3.60	2.97	5.25
17	....	....	....	....	....	....	....	....	....	3.40	2.87	7.47
18	....	....	....	....	....	....	....	....	....	3.40	2.87	6.23
19	....	....	....	....	....	....	....	....	....	3.47	2.85	5.4
20	....	....	....	....	....	....	....	....	....	3.50	2.80	5.18
21	....	....	....	....	....	....	....	....	....	3.48	2.82	4.93
22	....	....	....	....	....	....	....	....	....	3.35	2.85	8.43
23	....	....	....	....	....	....	....	....	....	3.18	2.65	6.90
24	....	....	....	....	....	....	....	....	....	3.18	2.80	5.5
25	....	....	....	....	....	....	....	....	....	3.20	2.73	5.23
26	....	....	....	....	....	....	....	....	....	3.00	2.90	4.72
27	....	....	....	....	....	....	....	....	....	3.15	3.15	4.55
28	....	....	....	....	....	....	....	....	....	7.03	3.13	....
29	....	....	....	....	....	....	....	....	....	6.83	3.05	....
30	....	....	....	....	....	....	....	....	....	5.57	2.93	....
31	....	....	....	....	....	....	....	....	....	5.00	....	....

A discharge measurement by P. M. Churchill and C. C. Covert, hydrographers, October 15, 1902, showed the discharge 1,123 second-feet, gauge height 3.95.

EAST BRANCH DELAWARE RIVER AT HANCOCK, DELAWARE COUNTY, N. Y.

East Branch Delaware River flows parallel to the West Branch across Southern Delaware County. The drainage area is broader and the tributaries longer and more branching than is the case for the West Branch. Many of the tributaries head in small lakes and ponds.

The gauging station is situated at the highway bridge in Hancock Village. A fifteen-foot weight and wire gauge graduated decimally is attached to the horizontal chords of the upstream side of the second span from the left-hand or south abutment. The reference point is a circular chisel draft on the downstream corner of the left-hand abutment. Its elevation referred to the bench mark described above in connection with the station on the west branch of the stream is 98.52.

The elevation of the datum plane of the gauge, or of water surface when the gauge reads zero, is 70.59, or 5.16 feet lower than that for the West Branch station.

The bridge consists of five spans, and has a length between abutments of 425.5 feet. Discharge measurements are usually made from the downstream side. Bridge is marked off in five-foot spaces beginning at right-hand abutment.

During low water the topographical elevation of water in the East Branch is lower than that in the West Branch at the respective gauging stations. There is considerable fall in each branch from the gauging station to the mouth of the stream.

The gauge was erected October 14, 1902, by P. M. Churchill and C. C. Covert. The gauge is read twice daily, at 8 a. m. and 4 p.m., by D. B. Van Etten. A discharge measurement was made by Messrs. Churchill and Covert October 14, 1902; gauge reading was 4.345; discharge 2,320 second-feet.

The drainage area tributary to each branch between the gauging station and the mouth of the stream is approximately one square mile.

Mean Daily Gauge Height of East Branch, Delaware River at Hancock, Delaware County, N. Y,

DAY.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1902.												
1	....	....	....	....	....	....	....	....	....	......	4.85	3.40
2	....	....	....	....	....	....	....	....	....	......	4.55	3.40
3	....	....	....	....	....	....	....	....	....	......	4.40	3.50
4	....	....	....	....	....	....	....	....	....	......	4.25	3.70
5	....	....	....	....	....	....	....	....	....	......	4.10	3.70
6	....	....	....	....	....	....	....	....	....	......	4.00	3.50
7	....	....	....	....	....	....	....	....	....	......	3.95	3.50
8	....	....	....	....	....	....	....	....	....	......	3.80	3.70
9	....	....	....	....	....	....	....	....	....	......	3.70	5.75
10	....	....	....	....	....	....	....	....	....	......	3.60	5.60
11	....	....	....	....	....	....	....	....	....	......	3.60	5.90
12	....	....	....	....	....	....	....	....	....	......	3.60	5.55
13	....	....	....	....	....	....	....	....	....	......	3.60	5.60
14	....	....	....	....	....	....	....	....	....	......	3.50	5.85
15	....	....	....	....	....	....	....	....	....	4.20	3.40	5.95
16	....	....	....	....	....	....	....	....	....	4.10	3.40	6.50
17	....	....	....	....	....	....	....	....	....	4.00	3.40	8.65
18	....	....	....	....	....	....	....	....	....	3.90	3.30	6.35
19	....	....	....	....	....	....	....	....	....	3.80	3.30	5.50
20	....	....	....	....	....	....	....	....	....	3.80	3.30	5.00
21	....	....	....	....	....	....	....	....	....	3.75	3.20	4.80
22	....	....	....	....	....	....	....	....	....	3.60	3.20	10.00
23	....	....	....	....	....	....	....	....	....	3.60	3.20	7.45
24	....	....	....	....	....	....	....	....	....	3.50	3.30	5.75
25	....	....	....	....	....	....	....	....	....	3.50	3.20	5.40
26	....	....	....	....	....	....	....	....	....	3.40	3.25	5.00
27	....	....	....	....	....	....	....	....	....	3.40	3.45	4.75
28	....	....	....	....	....	....	....	....	....	6.95	3.60	....
29	....	....	....	....	....	....	....	....	....	7.05	3.55	....
30	....	....	....	....	....	....	....	....	....	5.75	3.50	....
31	....	....	....	....	....	....	....	....	....	5.40	......	....

The location of the two gauging stations close to the mouths of the branches enables the total discharge of the main stream at the confluence of its principal branches to be determined.

The highest recent freshet on the East Branch occurred December 15-16, 1901. The elevation of water surface was 93.02 feet, equivalent to a gauge reading of 22.43 feet.

DELAWARE RIVER AT PORT JERVIS, ORANGE COUNTY, N. Y.

From Hancock to Port Jervis, a distance by river of 76 miles, Delaware River flows in a broad shallow channel with numerous slight rifts and a relatively rapid current. Several large tributaries enter in this section of the stream, notably Mongaup and Callicoon Creeks and Neversink River from the New York side, and the Lackawaxen River from Pennsylvania.[a]

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[a] For general description and drainage areas of Delaware River see Tenth U. S. census, Vol. XVI, pp. 607–638.

The following table shows the drainage areas of the Upper Delaware River and its principal tributaries:

STREAM AND LOCATION.	Square miles
Delaware River, at mouth	10,000
Delaware River, at Lambertsville, N. J.	6,820
Delaware River, at Port Jervis, below mouth of Neversink River	3,600
Delaware River at Port Jervis above mouth of Neversink River	3,254
Neversink River, at mouth	346
Lackawaxen River at mouth	597
Mongaup Creek, at mouth	231
Delaware River, below junction of branches at Hancock, N. Y.	1,604
West Branch Delaware River, above mouth at Hancock, N. Y.	685
West Branch Delaware River, above Oquaga Creek at Deposit, N. Y.	519
West Branch Delaware River, at Walton, N. Y.	348
East Branch Delaware River, at mouth, Hancock, N. Y.	919

The drainage area of Delaware River above Port Jervis lies about four-fifths in New York and one-fifth in Pennsylvania.

A gauging station was established on Lower Delaware River at Lambertsville, N. J., June 23, 1897, by E. G. Paul.[a]

Arrangements have been made for the establishment of a gauging station at the upper railroad bridge in Port Jervis. The bridge is situated about one mile upstream from the mouth of the Neversink River. The bridge consists of two spans and stands squarely across the stream; the current is smooth and uniform. The stream bed is cobblestone and gravel, and fairly permanent.

The following discharge measurements have been made by George B. Hollister, Resident Hydrographer for New Jersey, at the Barrett suspension toll bridge in Port Jervis:

DATE.	Gauge height.	Discharge, second-feet.
June 28, 1902	29.3	4,629
September 2, 1902	30.6	1,501

The gauge height as given is the distance down to water surface from a reference point on top of upstream guard rail 470 feet from the left-hand abutment.

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[a] Results are given in Water Supply and Irrigation Paper U. S. Geological Survey No. 65 page 214.

NEVERSINK RIVER AT PORT JERVIS, ORANGE COUNTY, N. Y.

Neversink River rises in Southwestern Ulster County. Two branches unite to form the main stream near Sullivan County line; the stream then flows southerly, crossing Eastern Sullivan County, and enters Delaware River at Port Jervis.

The watershed contains numerous small lakes. The fall is rapid and often precipitous. This stream has been suggested as a possible source of water supply for New York. The projected point of diversion being " The Kitchen " at Quarryville, at elevation 850 feet above tide. The drainage at this point is 200 square miles, and at the mouth of the stream 346 square miles.[a]

The gauging station is situated at the East Main Street highway bridge in Port Jervis.[b] A wire and weight gauge is secured to the ironwork of the bridge on the downstream side. The bench mark is an anchor bolt in top of cemetery wall on right bank of stream; its elevation is taken at 100.00. The datum plane of the gauge referred to this bench mark is 72.24. The station was established October 16, 1902, by P. M. Churchill and C. C. Covert. The gauge record is kept by Edwin J. Earley. Readings are taken at 8.30 a. m. and 5 p. m. each day.

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[a] See Freeman's Report on New York's Water Supply, 1900, page 491.
[b] Temporary.

Mean Daily Gauge Height of Neversink River at Port Jervis, Orange County, N. Y.

DAY.	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1											7.60	6.90
2											7.40	6.90
3											7.25	7.10
4											7.20	7.20
5											7.20	7.00
6											7.15	7.00
7											7.15	7.00
8											7.10	6.90
9											7.00	6.70
10											7.00	6.70
11											7.00	6.90
12											7.00	6.90
13											7.00	6.90
14											6.90	6.90
15											6.90	6.85
16										7.50	6.90	6.95
17										7.40	6.90	11.75
18										7.30	6.90	9.11
19										7.30	6.80	9.50
20										7.20		9.05
21										7.10		8.45
22										7.08		13.10
23										7.05	6.80	13.45
24										7.03	6.80	10.45
25										7.00	6.80	8.55
26										6.93	6.80	8.15
27										6.90	6.90	7.85
28										8.75	7.00	7.60
29										11.05	7.00	7.50
30										8.85	6.90	7.40
31										7.95		7.35

The bridge has a single span of 130 feet between abutments. The stream flows between entraining walls and has a rock bed, overlaid in part by earth. The discharge measurements are usually made from the upstream side of the bridge, which has been divided into 5-foot stations, beginning at the right-hand abutment.

Discharge Measurements.

1902.	Gauge height.	Second-feet.	Hydrographer.
October 16	7.45	945	Churchill and Covert.
November 10	7.00	524	F. H. Tillinghast.

Two discharge measurements were made before the gauge was placed by George B. Hollister.

June 28, 1902 .... Discharge 374 second-feet.

September 17, 1902.............. Discharge 15 second-feet.[a]

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[a] Low discharge probably due to repairs to eel weir, then in progress.

METHODS OF ANALYSIS OF WATER FOR COLOR, TURBIDITY, ALKALINITY AND HARDNESS.[b]

In connection with the gaugings of streams proposed as sources of supply for New York City, a series of sanitary analyses has been instituted at Mt. Prospect Laboratory in Brooklyn, through the courtesy of George C. Whipple, biologist in charge. The analyses, the results of which are here given, have been made by A. E. Place, W. W. Schlecht, H. K. Barrows, P. M. Churchill and F. H. Tillinghast, resident hydrographers.

Water samples are taken from Esopus Creek at Kingston, Catskill Creek at South Cairo, Walkill River at New Paltz, and Ten Mile River at Dover Plains by the resident hydrographer each time he visits the gauging stations to make discharge measurements. At the Housatonic River, Fishkill Creek, and Rondout Creek gauging stations, the gauge readers are supplied with two boxes, each containing four one-quart bottles with glass stoppers. The gauge reader takes a sample about every third day, and the bottles when filled are expressed to the Mt. Prospect Laboratory. The samples are taken by lowering the bottle from a bridge into the middle of the stream current. Later, other guage readers will be supplied in like manner and the waters will then be analyzed with more regularity. All analyses of samples are made by the hydrographer, and consist of tests for color, turbidity, alkalinity and hardness; these being expressed in parts per million.

Arrangements have been made for the extension of the turpidity and color tests to all streams which are being gauged throughout the State; field standards having been prepared by which the color and turbidity will be determined in connection with each discharge measurement.

The results of these analyses are shown graphically on the accompanying diagrams, the parts per million being plotted as ordinates, and the dates of collection of the water samples as abscissas. On the same chart and using the same data as abscissas and with gauge heights as ordinates, the daily gauge

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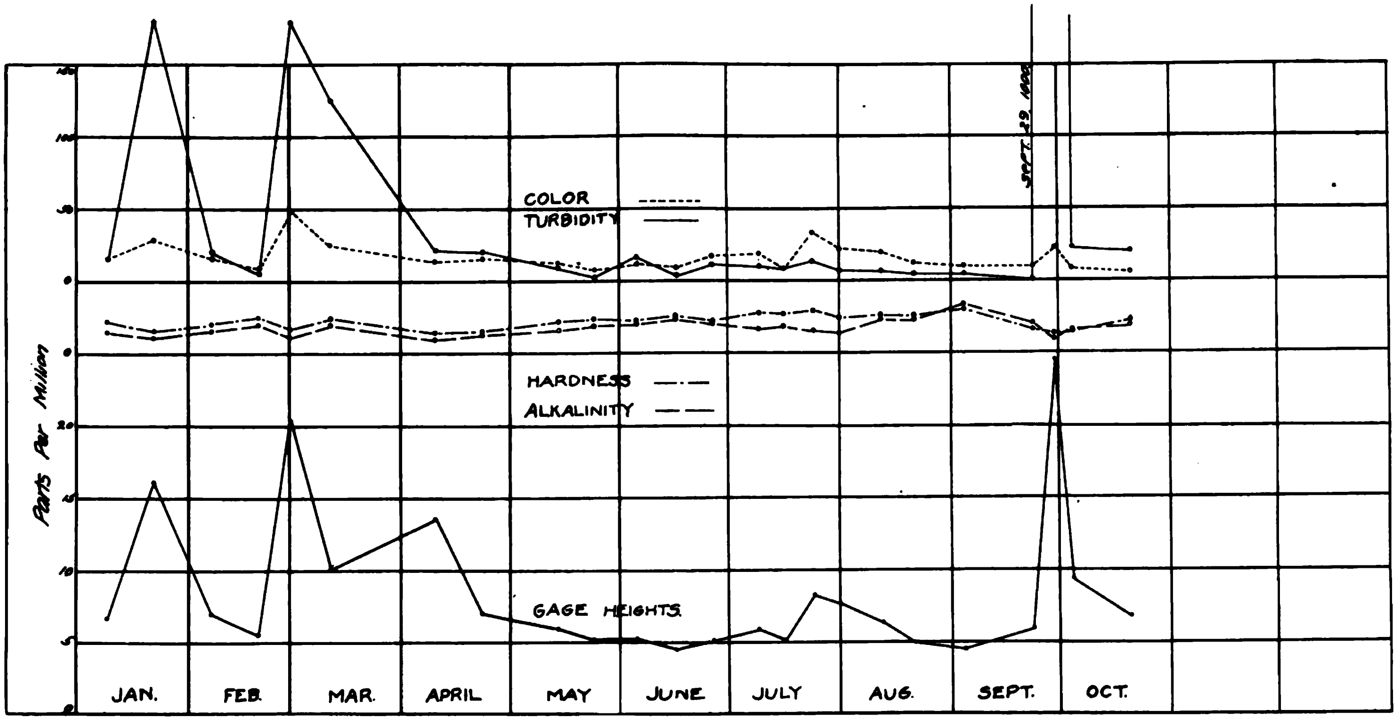
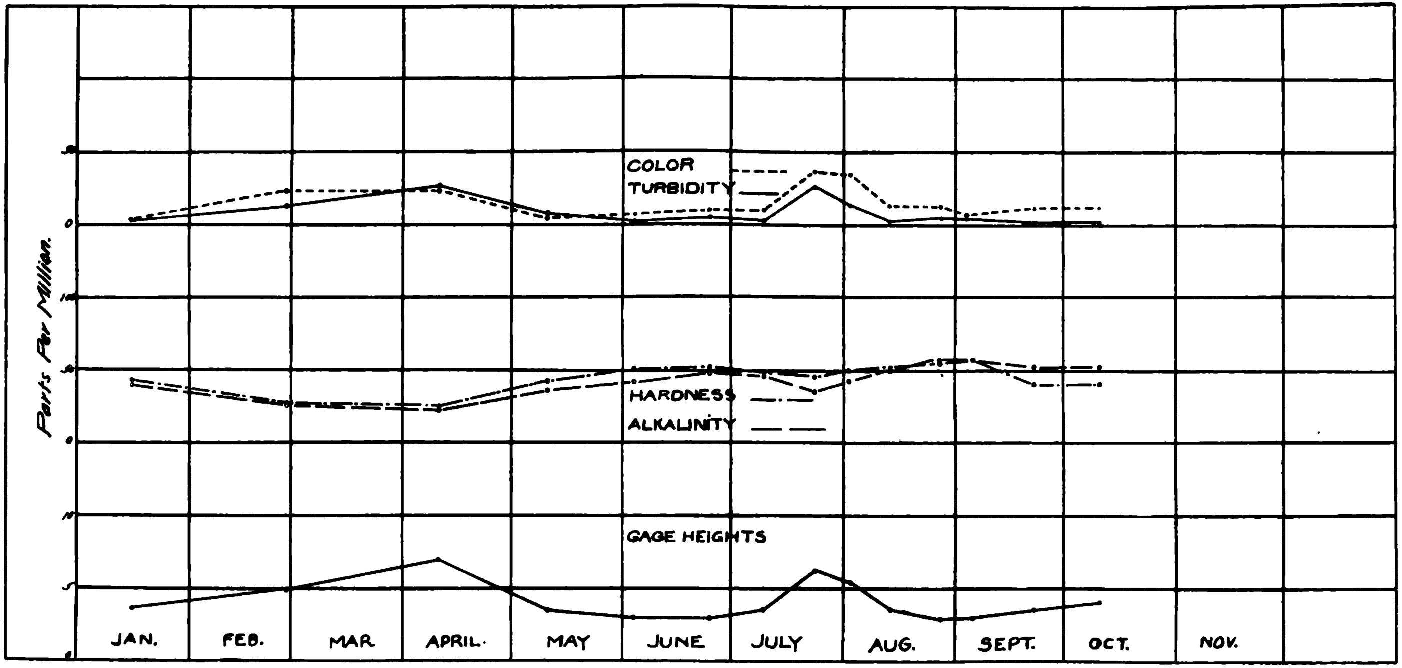
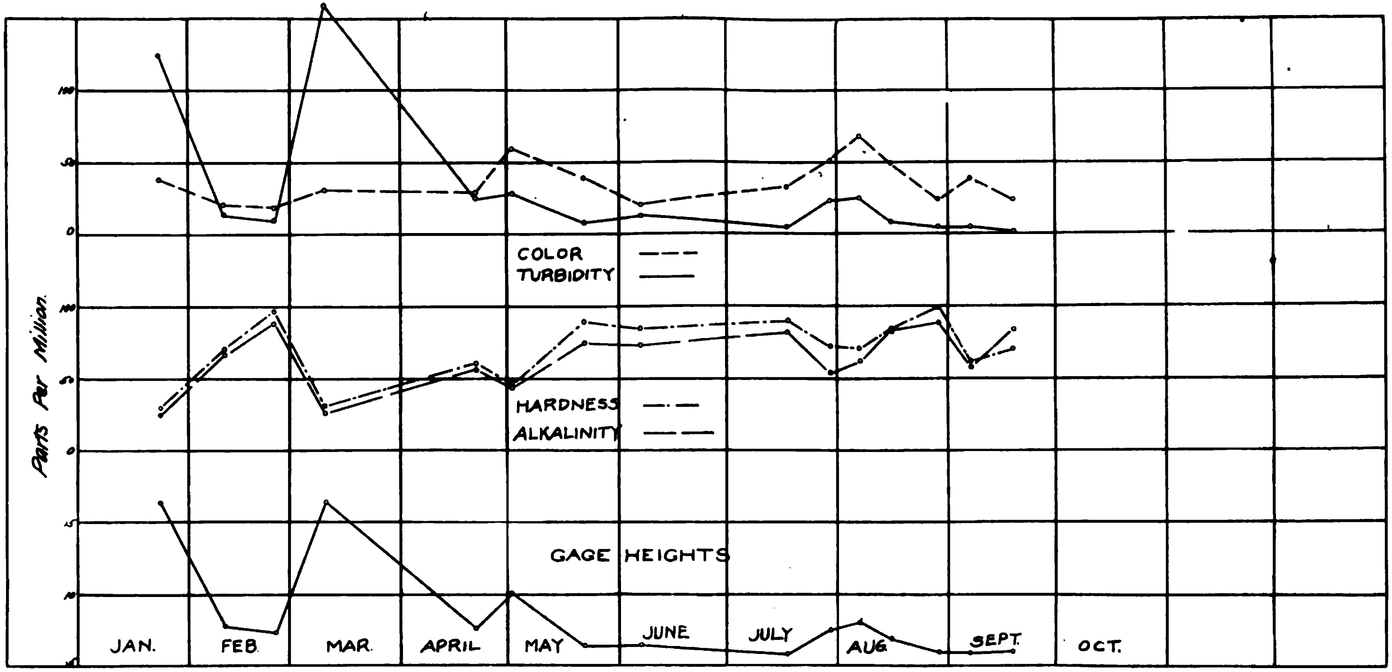
[b] Mainly from report of F. H. Tillinghast, Resident Hydrographer.



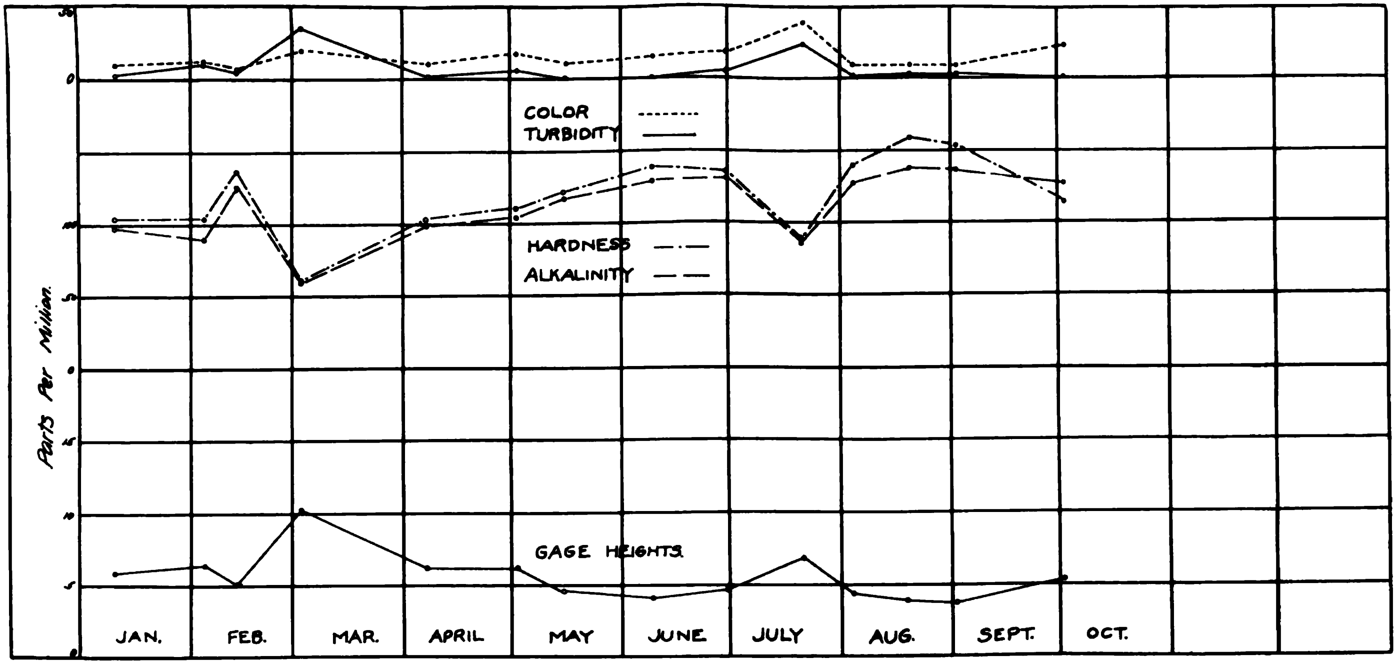
Results of tests of water samples, Esopus Creek at Kingston, Ulster County, N. Y., 1902.



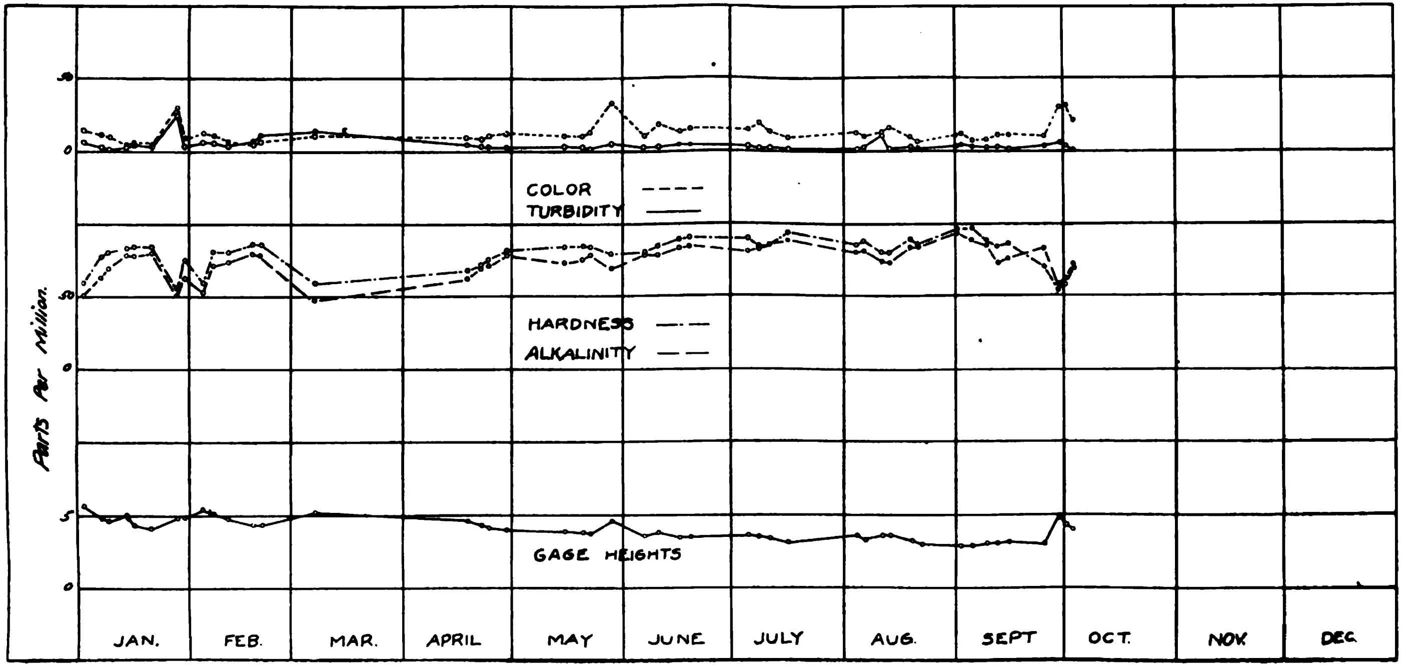
Results of tests of water samples, Catskill Creek at South Cairo, Greene County, N. Y.,' 1902.



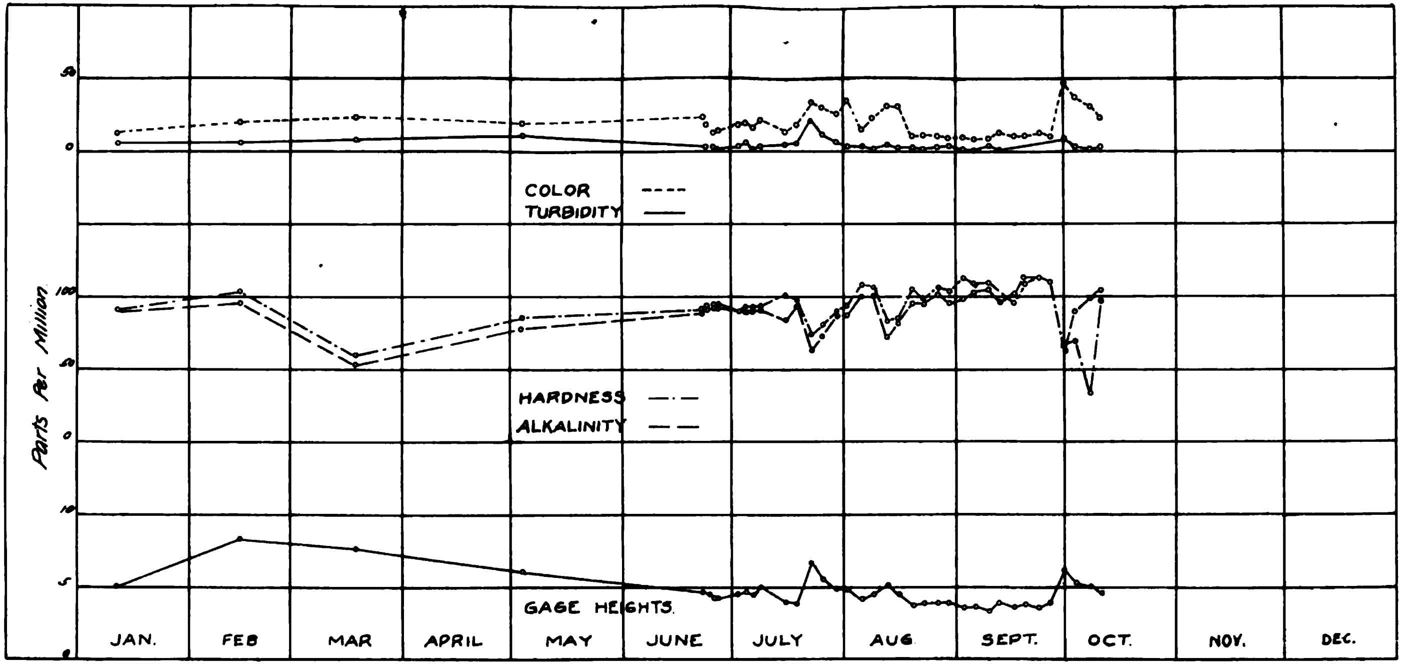
Results of tests of water samples, Wallkill River at New Palts, Ulster County, N. Y., 1902.



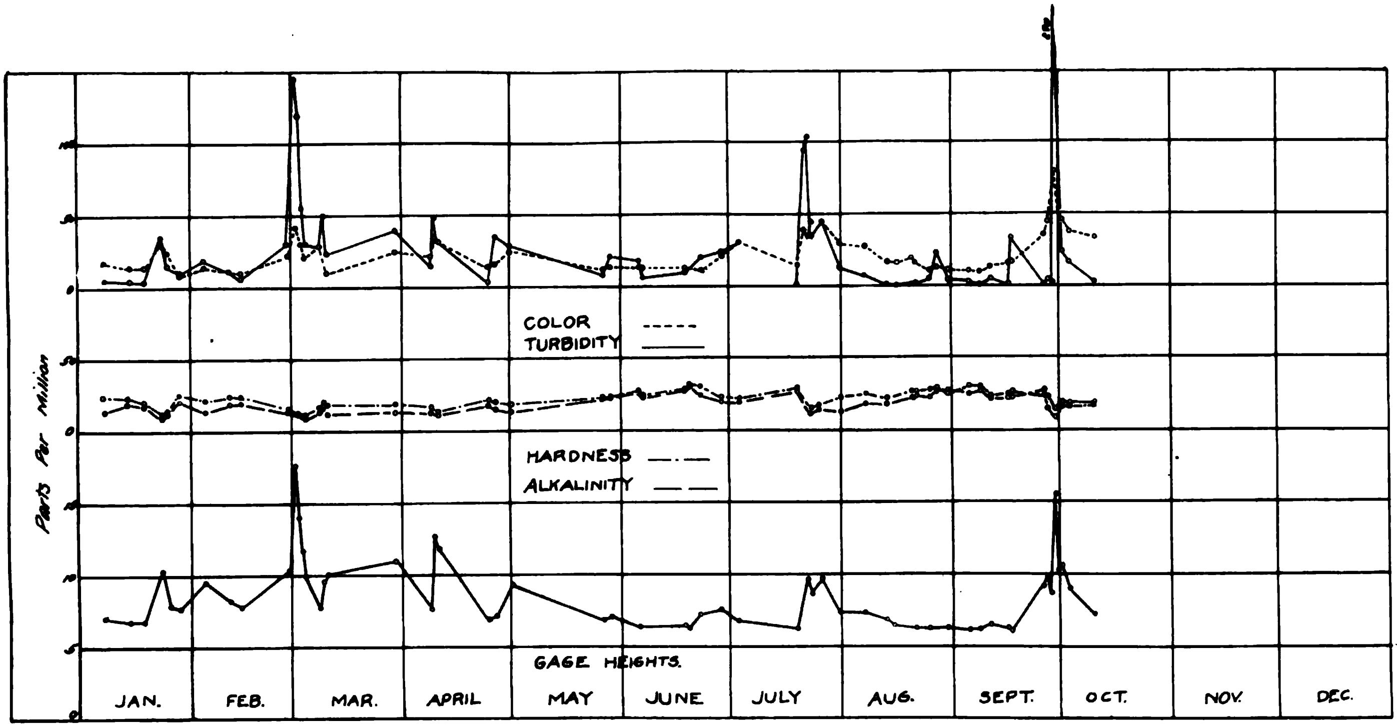
Results of tests of water samples, Ten Mile River at Dover Plains, Dutchess County, N. Y., 1902.



Results of tests of water samples Fishkill Creek at Glenham, Dutchess County, N. Y., 1902.



Results of tests of water samples, Housatonic River at Gaylordsville, Conn., 1902.



Results of tests of water samples, Rondout Creek at Rosendale, Ulster County, N. Y. 1902.

readings are plotted, thus showing the varying depths of the rivers throughout the year. The action of the rivers as regards color, turbidity, alkalinity and hardness at their various stages during the year may thus be readily compared.

There is no constant law of relation between the stream stage and the intensity of color, turbidity, etc., however. The analysis of a sample of a spring freshet water resulting from the melting of snow, and which has not come in contact with the soil or rock of the watershed, may be quite different from a sample taken at the same gauge height in a fall freshet when the year's accumulation of disintegrated mineral matters and humus are washed into the stream.

The methods employed in determining the amount of color, turbidity, alkalinity and hardness in the different river waters are those regularly employed in the Mt. Prospect Laboratory. The results obtained are all expressed in parts per million and are determined by testing against standard solutions. Owing to the importance of having like standards of comparison and methods of analyses wherever the results of examinations of water supplies are to be compared, a brief description of the methods employed is appended.

The color standards are those of the Platinum-Cobalt Method devised by Mr. Allen Hazen, and consist of twelve 50-cubic centimeters standard color tubes filled with water standardized from 0-5-10, etc., up to 55 parts per million. A standard solution, which has a color of 500, is prepared by dissolving 1,246 grains potassium-platinic chloride, containing 0.25 grain of cobalt in water, with 100 cubic centimeters concentrated hydrochloric acid, and making up to one liter with distilled water, by diluting the solution with known parts distilled water the graduated standards are obtained. Fifty cubic centimeters of the water analyzed are placed in one of the empty standard tubes and compared with the known standards by looking through the tubes, from top to bottom, at a white background.

In testing very turbid waters, it is necessary, first to filter the sample several times in order that color, which results chiefly from dissolved constituents, may be distinguished from turbidity, or the effect of fine solids held in suspension and which often overmask the true color effect.

Several methods of measuring the turbidity of water have been devised; the following standard has been adopted by the United States Geological Survey.[a] "The standard of turbidity shall be a water which contains 100 parts of silica per million in such a state of fineness that a bright platinum wire, one millimeter in diameter can just be seen when the center of the wire is 100 millimeters below the surface of the water, and the eye of the observer is 1.2 meters above the wire, the observation being made in the middle of the day in open air, but not in sunlight, and in a vessel so large that the sides do not shut out the light so as to influence the results. The turbidity of such water shall be 100."

The standards for testing turbidity are made up as above described with re-distilled water, and are placed in standard bottles; the standards range from (0) no parts per million up, as 0-5-10-15, etc. Before the test the standard is well shaken; the water sample to be tested is also well shaken in a similar bottle and compared with the different standards by holding to the light and observing the turbidity, by noting the distinctness and visibility of a dark object or line seen through the two bottles. The turbidity is gauged by that of the standard bottle shown by comparison to have a degree of opacity equal to that of the sample.

The testing solution for alkalinity consists of sulphuric acid, each cubic centimeter of which will neutralize 10 parts per million of calcium carbonate. One hundred cubic centimeters of the water to be tested are poured into a 6-inch porcelain evaporating dish, and one drop of methyl orange is added for an indicator. The water is then titrated with the sulphuric acid until the turning point is reached, showing a faint pink color. The number of cubic centimeters of sulphuric acid used, multiplied by 10, with the deduction of one cubic centimeter on account of the addition of the drop of methyl orange, gives the result for alkalinity in parts per million.

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[a] This standard was devised for the Geological Survey by Messrs. Allen Hazen and George C Whipple.

The test for hardness is obtained by the use of a standard soap solution so standardized that the number of cubic centimeters used in the analyses may be referred to a previously calculated table, which gives the results in parts per million. Fifty cubic centimeters of the water sample are poured into a 250 cubic centimeter bottle, and the soap solution is slowly added, the bottle being well shaken from time to time. When the results are such that a perfect lather is formed, the bottle is placed on its side and allowed to rest five minutes. If at the end of that time the lather has not broken in any place, but still covers the surface of the water, the number of cubic centimeters of the soap solution used is referred to the table, and the results for hardness in parts per million directly determined. If the lather does not remain five minutes, more of the soap solution must be added. The test for alkalinity is much more accurate than that for hardness. These two analyses being similar in character and results, they are somewhat comparable.

CATSKILL CREEK, SOUTH CAIRO, N. Y.

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Discharge second-feet.	Gauge height.	Color.	Turbidity	Alkalinity.	Hardness.
1901.						
Aug. 19	2	[a]2.62	6	1	58.0	....
Aug. 27	77	[a]2.95	11	2	48.0	....
Sept. 2	89	[a]3.00	7	2	53.0	....
Sept. 8	66	[a]2.90	9	2	55.0	....
Sept. 23	39	2.73	2	2	54.0	....
Oct. 4	36	2.70	4	1	51.0	....
Oct. 10	31	2.65	1	....	53.0	53.0
Oct. 22	51	2.82	6	3	50.0	....
Nov. 8	36	2.70	1	....	49.0	50.0
Nov. 19	42	2.75	3	1	50.0	50.0
Dec. 9	110[b]	3.30	2	....	38.0	44.5

[a] Taken from gauge height record.
[b] See rating table.

Date Collected.	Tested by	Date tested.	Gauge height.	Color	Turbidity.	Alkalinity.	Hardness.
1902.		1902.					
Jan. 15	W. W. Schlecht.....	Jan. 20	3.50	2	1	38	42
Feb. 27	W. W. Schlecht....	March 15	4.90	22	11	25	26
April 10	W. W. Schlecht....	April 14	6.70	22	25	22	24
May 10	W. W. Schlecht....	May 31	3.47	4	6	36	42
June 3	W. W. Schlecht....	June 28	2.82	6	1	42	50
June 24	W. W. Schlecht....	June 28	2.70	9	3	47	51.5
July 9	W.W.S & H. K. B.	July 12	3.40	9	2	45	47
July 23	H. K. Barrows.....	July 25	6.11	35	25	35	44.5
Aug. 2	H. K. Barrows.....	Aug. 8	5.36	33	12	42	49
Aug. 13	H. K. Barrows.....	Aug. 25	3.49	12	1	50	50.5
Aug. 27	H. K. Barrows.....	Sept. 9	2.74	11	4	[a]56	53
Sept. 5	H. K. Barrows.....	Sept. 9	2.79	6	4	56	56
Sept. 22	P. M. Churchill.....	Oct. 7	3.32	11	1	51	39
Oct 10	P. M. Churchill.....	Oct. 23	3.96	12	1	52	39.5
Nov. 17	....	Nov. 19	3.4	8	1	41	41.5
		1903.					
Dec. 3	....	Jan. 3	3.9	8	2	48	49

ESOPUS CREEK, KINGSTON, N. Y.

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Tested by	Date tested.	Gauge Height.	Color.	Turbidity.	Alkalinity.	Hardness.
1901.		1902.					
Aug. 25	....	....	[b]7.67	52	35	17.5	....
Aug. 27	....	....	[b]6.02	34	7	22	....
Aug. 29	....	....	[b]5.72	28	3	....	....
Sept. 4	....	....	[b]6.27	19	13	19	....
Sept. 21	....	....	4.78	11	3	23	....
Sept. 26	....	....	4.55	9	4	23.5	....
Oct. 3	....	....	5.25	16	6	18	....
Oct. 8	....	....	4.70	14	3	18	....
Nov. 17	....	....	6.30	14	10	14	15
Nov. 1	....	....	4.75	9	4	15	18
Nov. 14	....	....	4.45	9	2	17	22
Nov. 18	....	....	5.30	10	6	16	20.5
Dec. 4	....	....	[c]11.40	45	38	10	16
Dec. 19	W. W. Schlecht.....	Jan. 3	8.35	22	50	22.5	19
Dec 30	W. W. Schlecht....	Jan. 20	12.10	25	80	11	17
1902.							
Jan. 9	W. W. Schlecht....	Jan. 20	6.50	15	15	13	21
Jan. 22	W. W. Schlecht....	Feb. 3	16.00	29	180	10	15
Feb. 7	W. W. Schlecht....	Feb. 21	6.80	16	20	15	19.5
Feb. 20	W. W. Schlecht....	Feb. 21	5.35	8	5	19	23.5
March 1	W. W. Schlecht....	March 15	20.40	48	180	11	16.5
March 12	W. W. Schlecht....	April 1	9.90	25	125	18.5	23.5
April 10	W. W. Schlecht....	April 14	13.25	22	35	9	13.5
April 23	W. W. Schlecht....	May 9	6.94	16	21	13	15
May 14	W. W. Schlecht....	May 31	5.83	12	10	16	20
May 24	W. W. Schlecht....	May 31	5.02	8	4	19	24
June 5	W. W. Schlecht....	June 28	5.03	14	17	20	22.5
June 16	W. W. Schlecht....	June 28	4.48	10	5	24	26
June 26	W. W. Schlecht....	June 28	5.00	18	13	20	22
July 9	H. K. Barrows.....	July 25	5.80	20	12	16	27.5
July 16	H. K. Barrows.....	July 25	5.13	10	10	18	27.5
July 24	H. K. Barrows....	July 25	8.11	35	15	15	28.5
July 30	H. K. Barrows.....	Aug. 8	7.65	23	8	14	24
Aug. 12	H. K. Barrows.....	Aug. 24	6.28	21	8	24	26.5
Aug. 21	H. K. Barrows.....	Aug. 25	4.94	14	6	23	25.5
Sept. 4	H. K. Barrows.....	Sept. 9	4.49	11	6	34	31
Sept. 23	P. M. Churchill.....	Oct. 7	5.87	12	2	21	17
Sept. 29	P. M. Churchill.....	Oct. 7	24.5	70	1,000	10	15
Oct. 4	P. M. Churchill.....	Oct. 7	9.26	24	14	16	15.5
Oct. 20	P. M. Churchill.....	Oct. 23	6.70	23	5	20	23.5
Nov. 17	....	Nov. 19	5.62	14	3	20	20.5
		1903.					
Dec. 12	....	Jan. 3	6.60	12	7	21	21

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[a] Result uncertain. Probably too high.
[b] Taken from gauge height records.
[c] Backwater.

RONDOUT CREEK, ROSENDALE, N. Y.

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Dates collected.	Tested by	Date tested.	Gauge height.	Color.	Turbidity.	Alkalinity.	Hardness.
1901.		1902.					
Aug. 28	....	....	[a]7.15	42	4	37	....
Sept. 1	....	....	[a]7.62	32	20	23	....
Sept. 3	....	....	[a]7.80	66	6	11	....
Sept. 4	....	....	7.13	68	15	18	....
Sept. 19	....	....	6.87	30	12	18	....
Sept. 19	....	....	6.87	30	13	14	....
Oct. 1	....	....	6.50	26	4	17	....
Oct. 8	....	....	6.95	40	4	22	22
Oct. 15	....	....	7.65	26	8	22	[b]21
Oct. 22	....	....	6.70	28	3	20	[b]19
Oct. 31	....	....	6.50	24	4	24	[b]24
Nov. 13	....	....	7.00	21	14	26	27
Nov. 16	....	....	6.60	26	5	20	26
Nov. 19	....	....	6.40	21	2	20	24
Nov. 22	....	....	6.35	23	3	19	25
Nov. 26	....	....	7.30	32	7	17	23
Nov. 29	....	....	6.80	31	3	....	24
Dec. 3	....	....	6.40	23	7	21	24.5
Dec 6	....	....	6.80	21	3	21	23.5
Dec. 10	W. W. Schlecht....	Jan. 3	9.80	32	65	19	25
Dec. 11	W. W. Schlecht....	Jan. 3	9.50	38	[c]	13	20
Dec. 12	W. W. Schlecht....	Jan. 3	8.50	34	19	12	17.5
Dec. 15	W. W. Schlecht....	Jan. 3	16.70	80	[c]	13	18
Dec. 16	W. W. Schlecht....	Jan. 20	11.00	48	75	11	20
Dec. 25	W. W. Schlecht....	Jan. 20	7.25	13	7	14	26
Dec. 30	W. W. Schlecht....	Jan. 20	12.20	32	60	10	20
1902.							
Jan. 7	W. W. Schlecht....	Jan 20	7.00	17	5	14	24
Jan. 14	W. W. Schlecht....	Feb. 3	6.70	14	4	20	23.5
Jan. 18	W. W. Schlecht....	Feb. 3	6.70	14	3.5	18	21
Jan. 23	W. W. Schlecht....	Jan. 3	10.30	32	35	10	12.5
Jan. 25	W. W. Schlecht....	Feb. 3	7.90	23	15	12	14.5
Jan. 28	W. W. Schlecht....	Feb. 21	7.70	8	10	21	25.5
Feb. 4	W. W. Schlecht....	Feb. 21	9.50	14	18	14.5	21.5
Feb. 11	W. W. Schlecht....	Feb. 21	8.20	11	11	19.5	24.5
Feb. 14	W. W. Schlecht....	Feb. 21	7.85	10	6	20	24.5
Feb. 27	W. W. Schlecht....	March 15	10.45	22	30	13	15.9
March 1	W. W. Schlecht....	March 15	17.55	42	145	14	14.3
March 2	W. W. Schlecht....	March 15	14.00	40	120	14.5	13.5
March 3	W. W. Schlecht....	March 15	11.75	31	55	11	11.9
March 4	W. W. Schlecht....	April 1	9.90	21	30	9.5	12
March 8	W. W. Schlecht....	May 9	7.75	30	28	14	16.5
March 9	W. W. Schlecht....	April 1	9.50	19	50	14	21
March 10	W. W. Schlecht....	April 1	10	23	80	12.5	19.5
March 29	W. W. Schlecht....	April 1	11	25	40	14	19
April 8	W. W. Schlecht....	May 9	7.65	21	15	13	17
April 9	W. W. Schlecht....	May 9	12.70	35	48	12.5	15
April 10	W. W. Schlecht....	May 9	11.95	32	32	12	14
April 24	W. W. Schlecht....	May 31	6.90	14	4	18	22
April 26	W. W. Schlecht....	May 31	7.10	16	35	15.5	20.5
April 30	W. W. Schlecht....	May 31	9.30	25	28	13.5	19
May 26	W. W. Schlecht....	May 31	6.90	12	8	23	24.5
May 28	W. W. Schlecht....	June 28	7.10	14	21	23	24.5
June 5	W. W. Schlecht....	June 28	6.45	14	18	27	28
June 6	W. W. Schlecht....	June 28	6.40	13	7	23	25
June 18	W. W. Schlecht....	June 28	6.50	13	10	28	30
June 19	W.W. S. & H. K. B.	July 12	6.30	13	14	32	32.5
June 22	W.W. S. & H. K. B.	July 12	7.20	12	20	25	31.2
June 28	W.W. S. & H. K. B.	July 12	7.55	21	24	20.5	24.7
July 3	W.W. S. & H. K. B.	July 12	6.80	31	30	21.5	22.8
July 19	H. K. Barrows.....	July 25	6.30	15	2	27	30.5
July 21	H. K. Barrows.....	July 25	8.65	40	95	21	22
July 22	H. K. Barrows.....	July 25	9.75	35	105	15	19.5
July 23	H. K. Barrows.....	July 25	8.60	45	35	13	17
July 26	H. K. Barrows.....	Aug. 8	9.85	45	45	15	24
July 31	H. K. Barrows.....	Aug. 8	7.35	30	14	14	24
Aug. 7	H. K. Barrows.....	Aug. 8	7.39	28	8	19	26
Aug. 13	H. K. Barrows.....	Aug. 25	6.80	17	2	18	22
Aug. 15	H. K. Barrows.....	Aug. 25	6.50	16	1	22	22.5

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[a] Gauge heighths taken from daily gauge height records.

[b] Likely to low.

[c] No record.

RONDOUT CREEK, ROSENDALE, N. Y.—(*Concluded.*)

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Dates collected.	Tested by	Date tested.	Gauge height.	Color	Turbidity.	Alkalinity.	Hardness.
1902.							
Aug. 20	H. K. Barrows	Aug. 25	6.40	20	2	24	28
Aug. 21	H. K. Barrows	Aug. 25	6.35	16	2	25	27
Aug. 25	H. K. Barrows	Sept. 9	6.25	11	5	23	24.5
Aug. 27	H. K. Barrows	Sept. 9	6.30	14	23	30	29
Aug. 30	H. K. Barrows	Sept. 9	6.35	12	5	26	27.5
Sept. 5	H. K. Barrows	Sept. 9	6.10	11	4	26	31
Sept. 8	H. K. B. & P. M. C.	Sept. 20	6.20	11	2	28	31
Sept. 11	H. K. B. & P. M. C.	Sept. 20	6.50	14	6	23	24.5
Sept. 16	H. K. B. & P. M. C.	Sept. 20	6.30	17	3	23	26
Sept. 17	H. K. B. & P. M. C.	Sept. 20	6.20	17	34	23	28
Sept. 26	P. M. Churchill	Oct. 7	9.40	32	2	29	24.5
Sept. 27	P. M. Churchill	Oct. 7	10.00	45	5	17	23.5
Sept. 28	P. M. Churchill	Oct. 7	8.70	46	4	17	16
Sept. 29	P. M. Churchill	Oct. 7	15.60	80	270	10	15.5
Sept. 30	P. M. Churchill	Oct. 23	10.40	49	25	13	13.5
Oct. 1	P. M. Churchill	Oct. 23	10.65	46	24	17	18
Oct. 3	P. M. Churchill	Oct. 23	9.05	38	17	17	19.5
Oct. 10	P. M. Churchill	Oct. 23	7.20	34	4	19	19.5
		1903.					
Oct. 20	F. H. Tillinghast	Jan. 3	7.01	23	4	22	22
Oct. 23	F. H. Tillinghast	Jan. 3	6.80	22	5	21	23
Oct. 30	F. H. Tillinghast	Jan. 3	7.90	25	2	31	31
Nov. 3	F. H. Tillinghast	Jan. 3	7.05	25	5	23	24

WALLKILL RIVER, NEW PALTZ, N. Y.

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Tested by.	Date tested.	Gauge height.	Color.	Turbidity.	Alkalinity.	Hardness.
1901.		1902.					
Dec. 19	W. W. Schlecht	Jan. 3	13.70	55	38	37	42
Dec. 30	W. W. Schlecht	Jan. 20	20.20	35	45	24	26
1902.							
Jan. 23	W. W. Schlecht	Feb. 3	16.40	38	125	25	30
Feb. 10	W. W. Schlecht	Feb. 21	7.78	21	14	67	76
Feb. 24	W. W. Schlecht	March 15	7.30	19	10	89	97.2
Mar. 10	W. W. Schlecht	April 14	16.40	31	160	26	31
April 21	W. W. Schlecht	May 9	7.55	29	25	56	60
May 1	W. W. Schlecht	May 9	10.00	60	28	44	46
May 21	W. W. Schlecht	May 31	6.33	39	8	75	89
June 6	W. W. Schlecht	June 28	6.40	20	13	73	84
July 17	H. K. Barrows	July 25	5.70	33	5	82	90
July 29	H. K. Barrows	Aug. 8	7.49	52	23	54	72
Aug. 6	H. K. Barrows	Aug. 8	7.98	68	25	62	71
Aug. 15	H. K. Barrows	Aug. 25	6.72	48	8	83	84
Aug. 28	H. K. Barrows	Sept. 9	5.86	24	5	88	99
Sept. 6	H. K. Barrows	Sept. 9	5.78	38	5	57	61
Sept. 18	P M Churchill	Oct. 7	5.96	23	2	84	70
Nov. 18	....	Nov. 19	6.62	36	4	80	86
		1903.					
Dec. 2	....	Jan. 3	6.8	35	7	79	80

FISHKILL CREEK, GLENHAM, N. Y.

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Tested by.	Date tested.	Gauge height.	Color.	Turbidity.	Alkalinity.	Hardness.
1901.							
Aug. 21	....	....	......	3.9	2.0	88	....
Aug. 31	....	....	......	24	4.0	85	....
Sept. 4	....	....	......	24	6.0	88	....
Oct. 8	....	....	3.90	13	3.5	82	93
Oct. 10	....	....	3.85	11	2.0	94	100
Oct. 17	....	....	4.50	36	4.0	72	68
Oct. 25	....	....	4.05	16	2.0	88	84
Oct. 31	....	....	3.90	12	3.0	87	89
Nov. 5	....	....	3.90	12	5.0	85	89
Nov. 8	....	....	3.95	11	4.0	85	92
Nov. 13	....	....	4.35	17	4.0	80	87
Nov. 15	....	....	4.05	21	4.0	78	109
Nov. 19	....	....	3.95	13	4.0	79	94
Nov. 23	....	....	3.90	8	4.0	83	89
Nov. 26	....	....	4.30	22	5.0	74	84
		1902.					
Dec. 17	W. W. Schlecht....	Jan. 3	6.10	29	12	45	47
Dec. 19	W. W. Schlecht....	Jan. 3	5.10	21	7	58	64
Dec. 24	W. W. Schlecht....	Jan. 3	4.55	11	5	71	78
Dec. 26	W. W. Schlecht....	Jan. 3	4.55	13	4	74	79
Dec. 31	W. W. Schlecht....	Jan. 20	7.30	24	12	33	39
1902.							
Jan. 2	W. W. Schlecht....	Jan. 20	5.65	15	7	52	60
Jan. 7	W. W. Schlecht....	Jan. 20	4.80	12	3	66	78
Jan. 9	W. W. Schlecht....	Jan. 20	4.65	11	2	70	81
Jan. 14	W. W. Schlecht....	Feb. 3	5.00	5	3	79	83
Jan. 16	W. W. Schlecht....	Feb. 3	4.35	6	5	79	85
Jan. 21	W. W. Schlecht....	Feb. 3	4.15	6	3	82	85
Jan. 28	W. W. Schlecht....	Feb. 3	4.90	30	25	52	55.5
Jan. 30	W. W. Schlecht....	Feb. 21	4.95	9	4	63	77
Feb. 4	W. W. Schlecht....	Feb. 21	5.50	13	7	53	60
Feb. 7	W. W. Schlecht....	Feb. 21	5.20	11	6	72	82
Feb. 11	W. W. Schlecht....	Feb. 21	4.80	7	4	74	81
Feb. 18	W. W. Schlecht....	April 1	4.40	5	6	80	86
Feb. 20	W. W. Schlecht....	April 1	4.40	7	11	79	86
March 7	W. W. Schlecht....	April 1	5.20	11	14	48	60
April 18	W. W. Schlecht....	May 9	4.60	10	5	63	68
April 22	W. W. Schlecht....	May 9	4.30	9.5	4	70	72
April 24	W. W. Schlecht....	May 9	4.10	11	3	72	76
April 29	W. W. Schlecht....	May 9	4.00	13	3	79	82
May 15	W. W. Schlecht....	May 31	3.90	11	4	74	85
May 20	W. W. Schlecht....	May 31	3.80	11	3	76	85
May 22	W. W. Schlecht....	May 31	3.70	13	2	79	85
May 28	W. W. Schlecht....	May 31	4.55	34	5.5	70	80
June 6	W. W. Schlecht....	June 28	3.50	11	3	79	81
June 10	W. W. Schlecht....	June 28	3.80	19	4	79	85
June 16	W. W. Schlecht....	June 28	3.50	14	5	84	90
June 19	W. W. Schlecht....	June 28	3.50	16	5	86	91
July 5	H K. Barrows	July 25	3.60	15	4	81	90
July 8	H. K. Barrows	July 25	3.50	20	2	83	85
July 11	H. K. Barrows ...	July 25	3.40	14	3	86	86
July 16	H. K. Barrows	July 25	3.10	10	2	89	94
Aug. 4	H. K. Barrows	Aug. 25	3.60	13	2	81	86
Aug. 6	H. K. Barrows	Aug. 25	3.40	11	3	82	89
Aug. 11	H. K. Barrows	Aug. 25	3.60	14	12	74	81
Aug. 13	H. K. Barrows	Aug. 25	3.60	17	2	74	81
Aug. 19	H. K. Barrows	Sept. 9	3.20	10	3	84	90
Aug. 21	H. K. Barrows	Sept. 9	3.10	7	2	84	86
Sept. 1	H. K. Barrows	Sept. 9	2.90	12	4	94	96
Sept. 2	H. K. Barrows	Sept. 9	2.80	12	5	93	96
Sept. 5	W. K. B. & P. M. C.	Sept. 20	2.90	8	3	89	97
Sept. 9	W. K. B. & P. M. C.	Sept. 20	3.00	9	3	85	89
Sept. 12	W. K. B. & P. M. C.	Sept. 20	3.05	12	3+	73	85
Sept. 15	W. K. B. & P. M. C.	Sept. 20	3.20	12	2	77	87
Sept. 25	P. M. Churchill.....	Oct. 23	3.00	10	4	84	71.5
Sept. 29	P. M. Churchill....	Oct. 23	4.90	31	6	59	56.5
Oct. 1	P. M. Churchill....	Oct. 23	4.25	32	4	62	61.5
Oct. 3	P. M. Churchill...	Oct. 23	4.00	22	1—	72	69.5

FISHKILL CREEK, GLENHAM, N. Y.—(*Concluded.*)

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Tested by.	Date tested.	Gauge height.	Color.	Turbidity.	Alkalinity.	Hardness.
1902.							
Oct. 13	....	Nov. 19	5.0	36	4	57	67
Oct. 15	....	Nov. 19	4.3	33	4	70	68.5
Oct. 30	....	Nov. 19	4.85	36	4	63	71
Nov. 3	....	Nov. 19	4.2	17	3	64	67
		1903.					
Nov. 6	....	Jan. 3	4.0	14.0	5	70	78
Nov. 19	....	Jan. 3	3.7	12.0	2.5	78	78
Nov. 25	....	Jan. 3	3.65	13.0	2.5	77	81
Nov. 28	....	Jan. 3	3.85	15.0	4.0	76	83

TEN MILE RIVER, DOVER PLAINS, N. Y.

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Tested by.	Date tested.	*a* Gauge height.	Color.	Turbidity.	Alkalinity.	Hardness.
1901.							
Sept. 12	....	....	5.90	13	2	121	....
Oct. 26	....	....	5.00	12	4	134	142.0
Nov. 11	....	....	4.75	8	2	146	151.0
Nov. 22	....	....	4.80	8	2	147	154.0
Dec. 2	....	....	4.75	6	1	137	152.5
Dec. 17	W. W. Schlecht....	Jan. 3	8.41	26	12	79	86
Dec. 27	W. W. Schlecht....	Jan. 3	6.54	22	9	103	106
1902.							
Jan. 10	W. W. Schlecht....	Jan. 20	5.75	11	4	98	103
Feb. 4	W. W. Schlecht....	Feb. 21	6.30	13	11	90	104
Feb. 13	W. W. Schlecht....	Feb. 21	5.00	8	6	126	137
March 3	W. W. Schlecht....	March 15	10.08	21	36	60	61.1
April 7	W. W. Schlecht....	April 14	6.18	12	3	100	103
May 2	W. W. Schlecht....	May 31	6.13	19	7	105	112
May 15	W. W. Schlecht....	May 31	4.55	12	1	118	123
June 9	W. W. Schlecht....	June 28	4.11	16	1.5	130	139
June 30	W. W. S. & H. K. B	July 12	4.57	19	6	133	160
July 21	H. K. Barrows	July 25	6.87	40	25	88	90
Aug. 4	H. K. Barrows	Aug. 8	4.36	11	3	129	141
Aug. 19	H. K. Barrows	Aug. 25	3 95	10	4	138	160
Sept. 2	H. K. Barrows ...	Sept. 9	3.62	10	4	139	155
Oct. 2	P. M. Churchill ...	Oct. 7	5.37	24	1	127	116
Nov. 2	....	Nov. 19	4.87	12	1	131	143
		1903.					
Nov. 28	....	Jan. 3	4.90	12	1	134	139

a All gauge heights referred to old gauge used prior to March 15, 1902.

HOUSATONIC RIVER, GAYLORDSVILLE, CONN.

Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Tested by.	Date tested.	Gauge height.	Color.	Turbidity.	Alkalinity.	Hardness.
1902.		1902.					
Jan. 11	W. W. Schlecht....	Jan. 20	5.0	13	5	89	92
Aug. 12	H. K. Barrows	Aug. 25	5.2	32	5	73	83
May 3	W. W. Schlecht....	May 31	6.1	20	11	78	86
March 18	W. W. Schlecht....	....	7.63	24	[a]	53	60
Feb. 14	W. W. Schlecht....	Feb. 21	8.3	20	5.5	96	103
Sept. 30	P. M. Churchill....	Oct. 23	6.20	47	9	64	65.5
Oct. 3	P. M. Churchill....	Oct. 23	5.30	38	3	90	70
Oct. 7	P. M. Churchill....	Oct. 23	5.0	31	1	99	33
Oct. 10	P. M. Churchill....	Oct. 23	4.60	24	4	105	97
Oct. 29	....	....	4.05	19	3	103	103
Nov. 13	....	....	4.83	25	4	102	106
Nov. 23	....	....	4.10	21	5	100	105
Dec. 28	....	....	5.16	14	6	91	97
Sept. 9	H. K. Barrows	Sept. 20	3.4	10	1	105	109
Sept. 2	H. K. Barrows	Sept. 20	3.6	10	2	98	113
Sept. 5	H. K. Barrows	Sept. 20	3.6	9	1	104	110
Sept. 16	P. M. Churchill....	Oct. 7	3.6	12	0	103	97
Sept. 23	P. M. Churchill....	Oct. 7	3.6	14	0	113	113
Aug. 19	H. K. Barrows	Sept. 9	3.7	11	3	96	106
Sept. 19	P. M. Churchill....	Oct. 7	3.8	11	0	114	109
Sept. 26	P. M. Churchill....	Oct. 7	3.8	11	0	112	110
July 15	H. K. Barrows	Aug. 8	3.9	14	5	85	101
July 18	H. K. Barrows	Aug. 8	3.9	18	7	95	98
Aug. 22	H. K. Barrows	Sept. 9	3.9	11	2	96	99
Aug. 26	H. K. Barrows	Sept. 9	3.9	11	4	103	107
Aug. 29	H. K. Barrows	Sept. 9	3.9	10	3	96	104
Aug. 5	H. K. Barrows	Aug. 25	4.2	14	4	102	109
Sept. 12	H. K. Barrows	Sept. 20	3.9	13	2	97	104
June 25	W. W. Schlecht....	June 28	4.3	14	3	93	95
June 26	W. W. Schlecht....	June 28	4.3	15	2	94	95
June 23	W. W. Schlecht....	June 28	4.5	18	3	92	94
June 22	W. W. Schlecht....	June 28	4.7	24	4	89	92
July 6	H. K. Barrows	July 25	4.5	16	2	93	93
July 2	H. K. Barrows	July 25	4.6	18	3	90	90
July 4	H. K. Barrows	July 25	4.7	20	6	91	93
July 29	H. K. Barrows	Aug. 8	4.9	26	7	88	91
July 8	H. K. Barrows	July 25	5.0	22	3	91	94
July 25	H. K. Barrows	Aug. 8	5.6	30	12	73	82
July 22	H. K. Barrows	Aug. 8	6.7	34	22	63	75
Aug. 8	H. K. Barrows	Aug. 25	4.5	14	2	102	107
Aug. 15	H. K. Barrows	Aug. 25	4.5	31	3	85	86
Aug. 1	H. K. Barrows	Aug. 8	4.8	35	4	88	94
Oct. 14	F. H. Tillinghast.	Nov. 19	5.2	32	2	94	101
Oct. 17	F. H. Tillinghast.	Nov. 19	5.2	23	2	101	109
Oct. 21	F. H. Tillinghast.	Nov. 19	4.3	17	2	102	110
Oct. 24	F. H. Tillinghast.	Nov. 19	4.4	15	3	106	103
Oct. 28	F. H. Tillinghast.	Nov. 19	6.6	45	12	78	92.9
Oct. 31	F. H. Tillinghast.	Nov. 19	5.9	36	4	89	98.6
Nov. 4	F. H. Tillinghast.	Nov. 19	4.9	23	3	99	109
		1903.					
Nov. 11	F. H. Tillinghast.	Jan. 3	4.3	lost	....	....	....
Nov. 14	F. H. Tillinghast.	Jan. 3	4.5	14	2	104	106
Nov. 18	F. H. Tillinghast.	Jan. 3	4.2	13	1	104	108
Nov. 20	F. H. Tillinghast.	Jan. 3	4.3	12	2	102	108
Nov. 25	F. H. Tillinghast.	Jan. 3	4.0	12	2	108	105
Nov. 28	F. H. Tillinghast.	Jan. 3	4.6	14	3	102	104
Dec. 2	F. H. Tillinghast.	Jan. 3	4.1	14	2	105	107
Dec. 5	F. H. Tillinghast.	Jan. 3	4.6	16	2.5	100	106

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[a] No record.

HOUSATONIC RIVER, GAYLORDSVILLE, CONN.—(*Concluded.*)

Miscellaneous Tests Made at Mt. Prospect Laboratory, Brooklyn, N. Y.

Date collected.	Tested by.	Date tested.	Gauge height.	Color.	Turbidity.	Alkalinity.	Hardness.
		Sawkill near Kingston, N. Y.					
1901 Dec. 21	W. W. Schlecht...	1902. Jan. 20	......	0	2	13	14.5
		Shawangunk Kill above Gardiner, N. Y.					
1902. Jan. 13	W. W. Schlecht..	Jan. 20	......	14	9	22	24
		Wallkill River above Gardiner, N. Y.					
Jan. 13	W. W. Schlecht....	Jan. 20	......	33	15	74	83
		Spring at South Cairo, N. Y.					
June 24	W. W. Schlecht..	June 28	......	0	....	28.5	....

APPENDIX.

MEASUREMENT OF STREAM VELOCITIES IN VERTICAL PLANES.

The general method pursued in taking measurements of streams with current meter has been to submerge the meter six-tenths of the depth at each point of observation; it having been found that this method gives very nearly the true mean velocity without the application of an arbitrary reduction coefficient; it likewise affords a ready basis for making approximate calculations of the discharge. Furthermore the uniform use of the six-tenths method in all measurements aids in the comparison of the work of various observers. It is not assumed, however, that six-tenths of the sounding is the true index depth for all streams or for a given stream at all points in its section or at all stages. An effort is made in connection with the regular discharge measurements at each gauging station to determine the proper "index depth" and the relation of the velocity at six-tenths depth to the true mean velocity.

The method pursued consists in taking observations of velocity at every foot or half-foot increment of depth from surface to bottom in different verticals at each gauging station.

The following table shows the depth of the filament of mean velocity in various streams and as determined by several experimenters.

Depth below Surface of Point of Mean Velocity.

EXPERIMENTER.	Stream.	Depth.
Cyrus C. Babb	Potomac River	a 0.58
Humphreys & Abbot	Mississippi River	a .63
T. G. Ellis	Connecticut River	a .64
[illegible]	[illegible] Flume	a [illegible]
E. C. Murphy	Cornell Flume	b .65
F. C. Shenehon	Niagara River	c .38
L. C. Sabin	St. Clair River	d .62
H. A. Pressey	[illegible] Streams	e .61
R. E. Horton	New York streams	.615

a See Methods of Stream Measurement, Water Supply Paper No. 56, U. S. Geological Survey.
b See Accuracy of Stream Measurements, E. C. Murphy, Water Supply and Irrigation Paper No. 64, U. S. Geological Survey.
c Report Chief of Engineers, U. S. Army, [illegible], pages [illegible].
d Report Chief of Engineers, U. S. Army, [illegible], pages [illegible].
e Measurements of streams in the vicinity of New York, Water Supply and Irrigation Paper No. 79, H. A. Pressey.

The experiments of E. C. Murphy in 1900 and 1901, in the rectangular canal of Cornell Hydraulic Laboratory, showed that the position of the filament of mean velocity rose as the depth in the channel decreased. The result given in the table is that found for depths of 6 to 9 feet. For depths between 1 and 2 feet, the depth of mean velocity was .55 of the sounding. Murphy also found the depth of the mean filament to be less in a channel having free discharge at its lower end than where the outlet was obstructed. This fact may explain the remarkably low value of the depth of mean velocity found by E. C. Shenehon on Niagara River at International Bridge, fourteen miles upstream from Niagara Falls. The mean velocities in Shenehon's observations (5 to 6 feet per second) were also greater than those usually observed. The data .for Catskill streams include 78 vertical velocity curves on Rondout, Catskill, Fishkill and Esopus Creeks and Ten-Mile, Wallkill and Housatonic Rivers; taken mainly by A. E. Place and W. W. Schlecht in 1901. For 26 curves taken where stream beds were smooth, (gravel, sand, clay or silt) the average depth of the mean velocity filament was 58 per cent; for 25 curves taken on streams with rough, cobble or rock beds, the average depth of mean velocity was 62.5 per cent. The velocity at six-tenths depth was 98.7 per cent of the mean where the bed was smooth, and 101.5 per cent of the mean where the stream beds were rough. The average of 78 curves for all conditions was 101 per cent.

The following table shows the result of vertical velocity curves derived on streams of New York State by R. E. Horton, during 1901 and 1902.

DATA OF VERTICAL VELOCITY CURVES ON NEW YORK STREAMS.

Smooth Flowing Streams with Earth Beds.

PER CENT OF DEPTH.	West Canada Creek.*a*	Mohawk at Utica.*b*	Mohawk at Little Falls.*c*	Mohawk at Schenectady.*d*	Mean for smooth streams, open sections.	Mohawk at Utica, under ice.*e*
No. curves..........	7	4	12	8	31	13
05..................	113	120	109	108	112	77
15..................	112	119	109	109	112	91
25..................	113	118	110	108	112	103
35..................	111	115	109	108	110	114
45..................	108	111	108	105	107	123
55..................	103	106	105	104	104	119
65..................	97	100	101	102	100	114
75..................	91	90	94	98	94	103
85..................	82	72	93	89	87	88
95..................	73	42	69	68	66	70

a Twin Rock Bridge. *b* Genesee Street. *c* Suspension Bridge. *d* Freeman's Bridge. *e* Schuyler Street.

Streams with Rough Currents and Stony or Rock Beds.

PER CENT OF DEPTH.	Beaver River at Croghan.	Salmon River at Pulaski.	Oswego River near Minetto.	Mean for rough bed streams.	Mean for all streams without ice cover.
No. curves..........	9	5	1	15	52
05..................	116	119	130	118	113
15..................	118	115	128	118	113
25..................	118	111	124	117	112
35..................	117	107	118	114	110
45..................	113	105	110	110	107
55..................	107	100	104	105	103
65..................	98	98	96	98	98
75..................	86	89	84	88	90
85..................	72	82	68	76	81
95..................	49	74	40	57	62

STREAM.	Number curves.	Bed.	Per cent of mean vel. at .6 depth.	Depth at which vel. is mean.	Maximum vel. per cent of mean.	Depth per cent at which vel. is maximum.
Beaver River at Croghan..................	9	Rock.	103	63	118.2	22
Salmon River at Pulaski..................	5	Cobble.	99	58	121.5	Surf.
Oswego, Salmon, Beaver *a*................	15	Rough.	102	62.8	118	15
West Canada Creek........................	7	Cobble.	100	60	113.2	10
Mohawk River at Utica....................	4	Earth.	103.5	65	120.0	Surf.
Mohawk River at Little Falls *b*..........	12	Earth.	103.8	66.6	109.5	20
Mohawk River at Schenectady	8	Earth.	103.6	70	108.5	20
Various New York streams.................	52	......	100.8	61.5	113.0	15
Slow, deep, smooth streams............	31	Smooth.	103.5	66.0	112.4	20
Rapid, swift, rough streams..............	15	Rough.	102.0	63.0	113.0	10

a Twin Rock Bridge. *b* At Suspension Bridge.

Three of the accompanying diagrams show the mean vertical velocity curves obtained on the several streams in open section. The curve for Salmon River in which the mean velocity filament is highest, represents a case of "free discharge below" as described by Mr. Murphy.

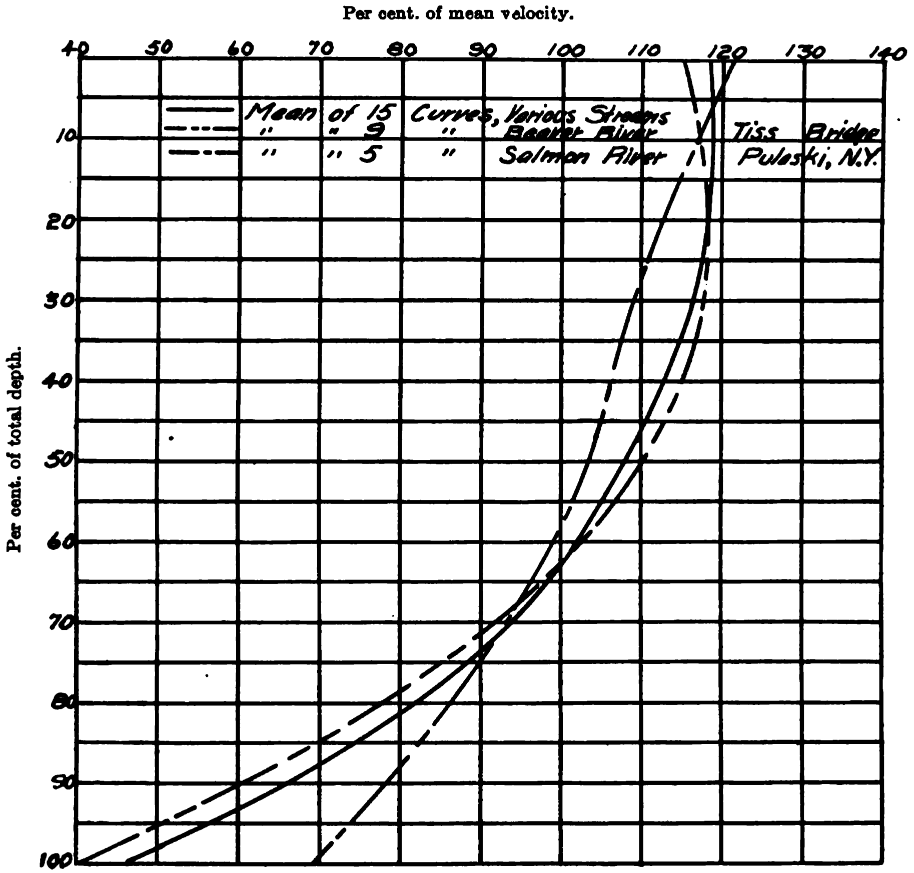
In the general New York curves, the filament of mean velocity is at greatest depth for smooth flowing streams with earth beds and obstructed outlets, as for Mohawk River at Suspension Bridge and Schenectady, and for West Canada Creek at Twin Rock Bridge. The depth of mean filament decreases as the roughness of bed and rapidity and turbulence of the current increases.

In the fourth diagram, the mean vertical velocity curve obtained under a smooth ice cover on Mohawk River at Utica is compared with the mean vertical in an open section. The ice measurements were taken at Schuyler St., and the open section curves at Genesee St. The distance between the two sections is two miles by river, and the character of the river and channel is very uniform throughout. The river channel is straight and uniform for 1000 feet above the section used for ice measurements and was completely frozen over at the time the stream was measured.

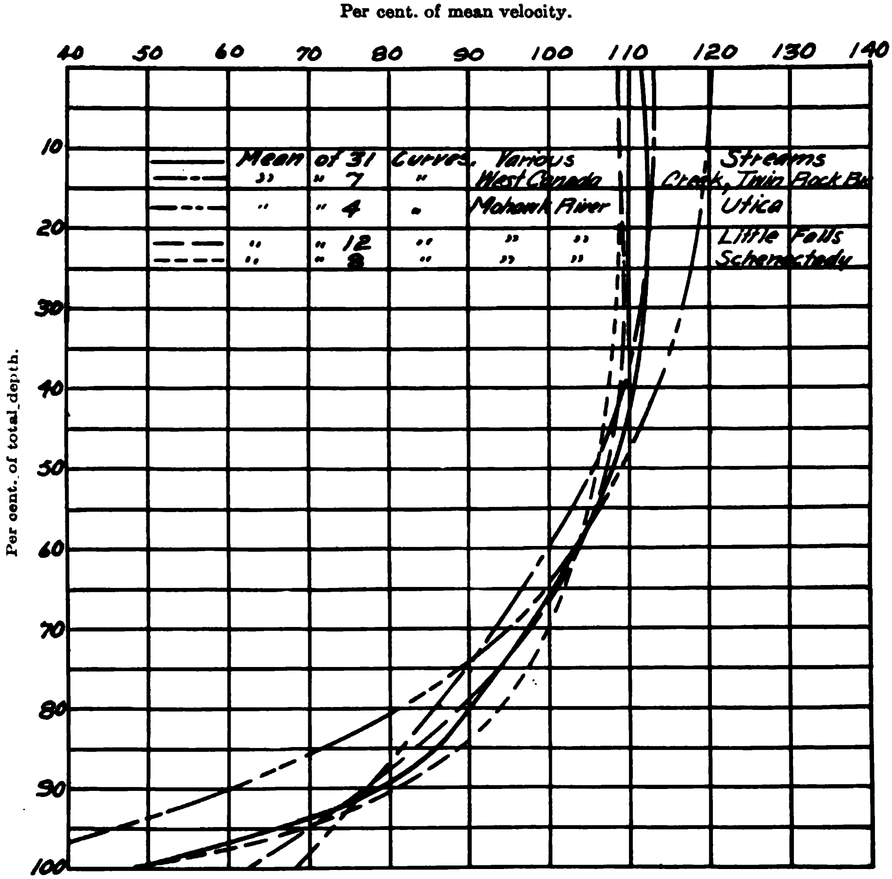
In the following table the results of these measurements are compared with a similar series of measurements under smooth ice cover for streams of the Catskill region. Depths and velocities are percentages of the total and mean respectively.

	Catskill streams.	Mohawk River.
Velocity at, under surface of ice [a]	66	66
Depth of maximum velocity	40	48
Maximum velocity, per cent of mean	115	122.8
Depth of mean velocity filament (upper)	12	22
Depth of mean velocity filament (lower)	72	77

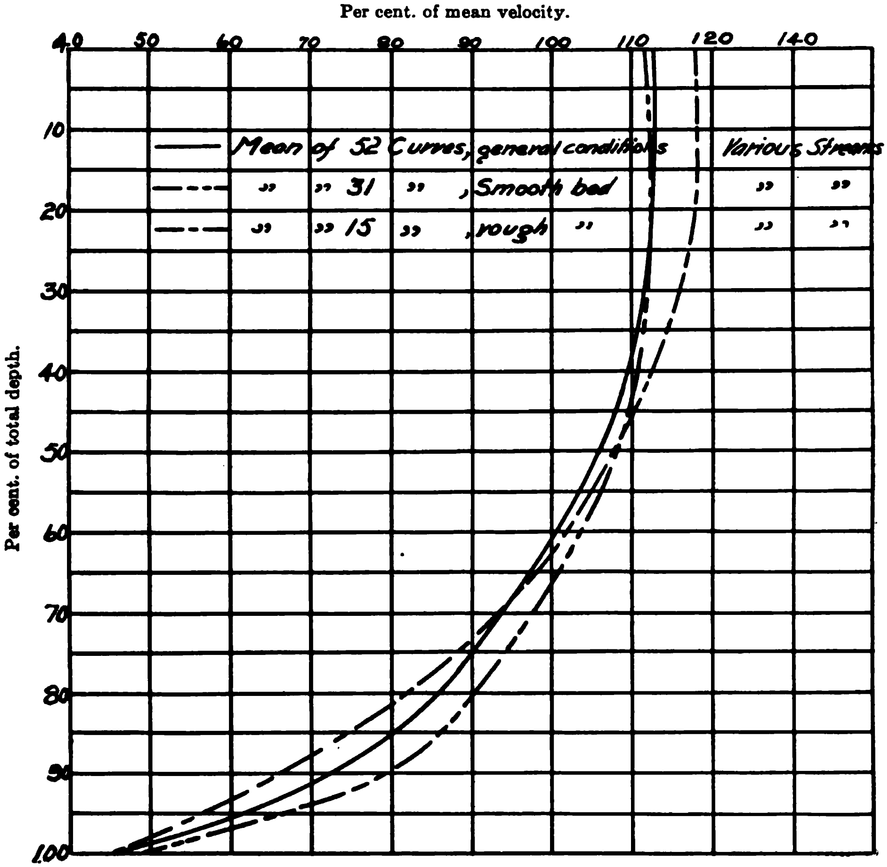
[a] Extrapolated from nearest point of measurement.



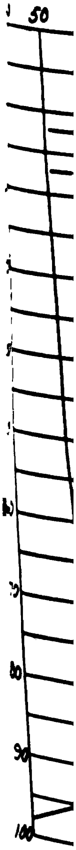
Comparison of mean vertical velocity curves for streams with rough currents and stony or rock beds.



Mean curves for various streams with deep, smooth currents and earth beds.



Comparison of vertical velocity curves for streams with smooth and rough beds.



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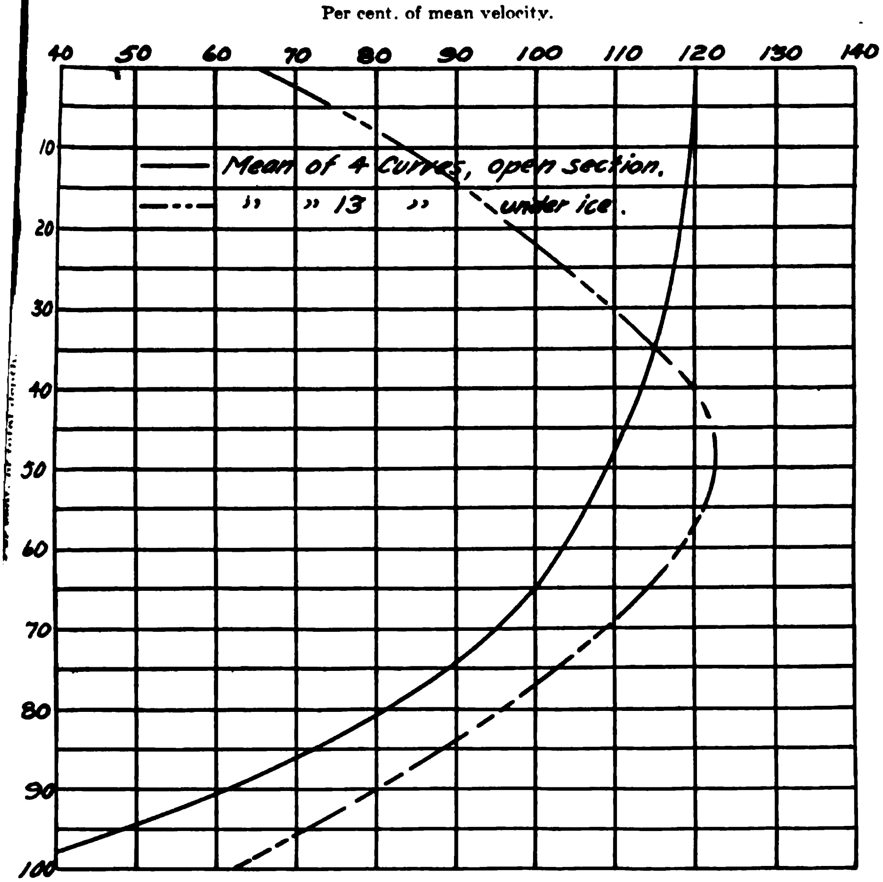

mparison of vertical velocity curves for Mohawk River at Utica, N. Y., for open and for ice-covered sections.

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Report of Co-operation of United States Geological Survey with State Engineer and Surveyor of New York.

DEPARTMENT OF THE INTERIOR:
United States Geological Survey,
Washington, D. C., *November* 21, 1902.

Hon. Edward A. Bond, *State Engineer and Surveyor, Albany, N. Y.:*

Sir.— I have the honor to make the following preliminary statement of work done during the field season of 1902, under the terms of your correspondence, May 1 and June 11, 1902, and mine of May 5 and June 9, 1902.

In this correspondence it was agreed that the co-operative topographic survey of the State of New York should be continued in accordance with the terms of the agreement signed by us under date of March 27, 1899, which agreement was extended to cover the work of the season of 1902, as provided for under act of Legislature of the State of New York, chapter 594 of the Laws of 1902, making appropriation of $20,000 for this work.

By the terms of the above you allotted $20,000 of current appropriation and $2,000 of unexpended balance of State appropriation made in 1901. In addition there remained an unexpended balance of State funds of the appropriation of the prior year, amounting to $1,317.77. There was thus a total of $23,317.77 of State funds available for co-operative work for the season of 1902.

The allotment by this bureau to the same work was a like sum of $22,000, and as there remained in addition an unexpended balance of 1901 appropriation, amounting to $9,574.56, there was thus a total of United States funds available for this co-operative work for the government fiscal year 1902-3, amounting to $31,574.56. The gross sum available, therefore, for the year 1902-3 aggregated $54,892.33.

There has resulted from the expenditures incurred under the foregoing agreement, a great amount of primary triangulation and spirit leveling for the control of areas over which topographic mapping may now be extended. An accurate trigonometric survey was completed of an area of 2,310 square miles at an expenditure of $3,500 for field work only, or at an average of $1.50 per square mile. In addition to existing unmapped data of like character this triangulation furnishes control for the future mapping of 12,770 square miles, which will be represented on fifty-five atlas sheets. The primary spirit leveling resulted in the running of 2,566 linear miles, in the course of which 103 permanent bench marks of bronze or aluminum were established, and the positions of many other points were accurately determined.

There has resulted from field operations of the past season, in addition to the above primary control, a complete and accurate map on a scale of 62,500, or approximately one mile to the inch, and with a contour interval of twenty feet, of 3,090 square miles, all within the borders of the State. The results of these surveys will be published on fifteen separate atlas sheets, covering portions of twenty-one different counties. There were in addition eleven other atlas sheets, covering 2,420 square miles, in portions of sixteen different counties, partly surveyed. For those portions, the surveys of which were completed, the total expenditure was about $25,000 and the average rate of expenditure was approximately $8.25 per square mile for field work only.

The total cost of the above work, including topographic surveys, primary triangulation and precise leveling, and including also estimated expenses for the platting and drafting of the maps, and the computation of trigonometric positions in the office during the coming winter is $47,500. The average cost of the topographic surveying, including expenditures on all accounts within the area of the State since the commencement of this work, has been to date $12.31 per square mile.

As the total allotment to this work was $54,892.33, there will remain a balance of State and federal money at the beginning of the next field season, in the spring of 1903, after deducting estimated office expenses, of approximately $7,392, which will be devoted to field work in the State in the early spring. I respectfully suggest that the balance be devoted to the completion of the following partially mapped sheets, viz., Highmarket, Orwell, Taberg, Piseco Lake, Tupper Lake, St. Regis, Loon Lake, Clymer, Falconer, Nineveh and Mt. Morris, and such others as you may designate.

Very respectfully,

CHAS. D. WALCOTT,

Director.

CO-OPERATIVE TOPOGRAPHIC SURVEY OF THE STATE.

In chapter 594 of the Laws of 1902, authority was given the State Engineer and Surveyor to continue co-operation with the Director of the United States Geological Survey in making a topographic survey and map of the State of New York, for which purpose the sum of $20,000 was appropriated.

Under the provisions of this law an agreement was entered into through correspondence between Hon. Chas. D. Walcott, Director of the United States Geological Survey and myself, that of the former under dates of May 1 and June 11, 1902, and mine of May 5 and June 9, 1902, whereby it was provided that the co-operative topographic survey of the State should be continued in force in accordance with the terms of the agreement signed by us under date of March 27, 1899, which was extended to cover the work of the season of 1902.

By the terms of the above the State of New York allotted $20,000, and to this was added $2,000 of unallotted balance of the State appropriation of 1901, and in addition the unexpended balance of State funds from the appropriation of 1901, amounting to $1,317.77. The total of State funds, therefore, available for co-operative work for the season of 1902 was $23,317.77. The federal bureau allotted to the same work a like sum of $22,000, and in addition an unexpended balance of 1901 funds, amounting to $9,574.56, making a total of United States funds available for this co-operative work for the government fiscal year, 1902-3, of $31,574.56.

There was, accordingly, available for co-operative topographic surveys within the State of New York during the season of 1902-3, a sum amounting to $54,892.33.

RÉSUMÉ OF RESULTS.

Primary triangulation was extended over an area of 2,310 square miles during the past season, and thirty-four stations were occupied. The positions of these have been suitably monumented and exactly determined. This work was distributed over the counties of Jefferson, Lewis, Oswego, Cattaraugus, Chautauqua, Genesee, Wyoming and Livingston.

Appended hereto will be found the descriptions and final computations of primary triangulation stations located in the prosecution of this work during the previous field season of 1901. Those determined during the present field season, 1902, will be published in my next annual report, after their positions have been computed in office.

Lines of precise levels were run between Rochester and Hornellsville, Buffalo and Dunkirk, and between Salamanca and Corydon, Pa. There were 113 miles of such levels run and nine benches were permanently marked by metal tablets.

Including the above, and the primary levels run to control the topographic mapping, there were run a total of 2,566 miles of principal levels which are permanently marked by 103 metal tablets.

The topographic mapping was completed of fifteen separate atlas sheets, covering portions of twenty-one different counties. Besides these there were eleven other atlas sheets covering portions of sixteen different counties, partly mapped. Of the area of the State, 3,090 square miles were finally mapped during the season, and 2,420 square miles partly surveyed. The results are embodied in a tabular statement in another part of this report.

CONCLUSIONS AND RECOMMENDATIONS.

To date there have been surveyed and mapped 162 atlas sheets, representing the topography of 31,106 square miles, or over sixty-four per cent. of the entire area of the State. There have been engraved and published 124 separate atlas sheets, representing the topography of 22,206 square miles.

The average cost of mapping this area to date has been approximately $12.31 per square mile, of which sum the State has expended $166,875.00 of a total outlay of $389,136.00. With

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the expenditure of $12.31 per square mile the outlay to the State ceases. The federal bureau, however, has additional expenses to meet in engraving the maps, in printing them, and in the prosecution of the geologic and hydrographic surveys which follow the publication of the topographic maps.

There remain unmapped about 18,035 square miles of the area of the State, which will be represented on eighty-two additional atlas sheets. Of this area 12,770 square miles, included within fifty-five atlas sheets, is now controlled by primary triangulation and precise leveling and ready for the final topographic mapping.

I earnestly recommend the enactment of legislation similar to that of Act of Legislature, Laws of 1902, chapter 594, whereby an additional $20,000 shall be appropriated for the continuation of this important work.

PLANS.

Immediately upon enactment of legislation plans for the field season of 1902 were completed by this office in correspondence with Mr. H. M. Wilson, geographer in charge of field work. They were so arranged as to provide for the completion, first, of the mapping of areas unfinished in the previous season, and thereafter the mapping of such areas as have been most urgently called for by communications addressed to this office by members of the Legislature and city and county officials, and to meet the needs of the work of this office.

These plans provided for the completion, if possible, of two partially mapped sheets and two new sheets on the southern and western slopes of the Catskills; of one partially mapped sheet and of one new sheet in the Adirondacks; of two sheets on Long Island; of one east of the Hudson river, and three in the western part of the State. Also of two sheets in the neighborhood of Boonville and Carthage.

Later in the season as the work progressed, it was evident that a larger amount of work could be done than had been arranged for and it was planned to map two additional sheets in the Genesee valley.

Finally, it was planned to extend primary triangulation for the future control and topographic mapping of such portions of the western and central counties as were yet uncontrolled, and to run two short links of precise levels, which in conjunction with the precise leveling of this year by the United States Army Engineers and the United States Coast and Geodetic Survey, would complete the final precise level net of the State.

RESULTS.

The results of the plans as carried out are shown in the following statement of results of operations during the field season of 1902. This report is arranged under three separate heads; namely, Triangulation, Precise Leveling and Topographic Surveying. Practically all of the work planned for the season was completed.

Triangulation.— Primary control was commenced early in the season by three parties. Professor A. H. Thompson, geographer, was engaged from the first week in May until the middle of November in extending primary triangulation for the control of sheets in Cattaraugus and Chautauqua counties, and in the lower Genesee valley in Livingston and Wyoming counties. Mr. E. L. McNair, topographer, was engaged from May to July, inclusive, in extending primary triangulation for the control of additional sheets in northern Livingston and Wyoming counties and in Genesee. Mr. Oscar Jones, topographer, from May to July, inclusive, in securing primary control for a group of sheets in northern Oswego and Oneida counties, and in Lewis. Great difficulty was encountered by this party in extending primary triangulation, owing to the flat and wooded character of the country, and later on this method was abandoned for primary traverse by means of which the result sought was satisfactorily accomplished. In all thirty-four triangulation stations were occupied and their positions determined. This control covered an area of 2,310 square miles and rendered available for future topographic mapping ten additional sheets. Including areas controlled prior to this season there is now available for future topographic mapping 12,770 square miles, which will be reproduced on fifty-five separate atlas sheets.

Precise Leveling.— A party under Mr. D. H. Baldwin, topographer, was employed during the months of July and August in running three short check lines to cut up the larger precise level net in which some slight discrepancies had been discovered. This party extended work from the neighborhood of Scottville, Monroe county, whence the line was brought in the previous season from the United States engineer bench mark at Charlotte, north of Rochester, and ran southward via Mt. Morris to Hornellsville, where connection was made with the precise level line previously run by this survey. He also extended precise levels from the United States engineer bench mark at Buffalo along the shore of Lake Erie to Dunkirk, where connection was made with another precise level bench mark previously established by this survey.

Finally, he extended a tie line from Salamanca south westward to the Pennsylvania line to check an error in previous leveling. The total mileage of precise levels was 113, and is marked permanently by nine metal tablets.

Topographic Surveying.— Several parties headed by assistant topographers were grouped under the immediate supervision of Mr. J. H. Jennings, topographer. Field work was commenced by these early in May and continued until the middle of November. Mr. Jennings had charge of a party which completed the mapping of Carthage and Greene sheets, and secured the control for and partly mapped the Highmarket, Orwell, Taberg and Piseco Lake sheets. With the assistance of Mr. Gilbert Young, assistant topographer, he completed the mapping of Boonville, and with the aid of Mr. J. M. Whitman, Jr., assistant topographer, the mapping of Bainbridge. With the aid of Mr. E. G. Hamilton, assistant topographer, he completed the mapping of Hobart.

Mr. G. S. Smith, topographer, was in general charge of the mapping in the northern Adirondacks and on Long Island, aided by several assistant topographers. Messrs. Smith and T. Foster Slaughter, assistant topographer, had charge of parties which completed the mapping of Saranac Lake sheet. Messrs. Slaughter and Whitman, Jr., had charge of parties which completed the mapping of Long Lake sheet, both in the Adirondacks. Messrs. Smith, Slaughter and Geo. H. Guerdrum completed control for and partially mapped the St. Regis, and Messrs. Smith and W. O. Tufts, partially mapped the Tupper Lake sheet. Mr. Tufts controlled Loon Lake sheet. On Long Island, Messrs. Smith and Guerdrum had, at different times, charge of a party which completed the mapping of Setauket and Fire Island sheets.

Mr. A. C. Roberts, topographer, was in charge of a party which completed the mapping of Wayland, Caledonia and Chautauqua sheets, and the partial mapping of Clymer and Falconer sheets. Mr. C. C. Bassett, topographer, had charge of a party which completed the mapping of Richmondville quadrangle, and Mr. W. H. Lovell, topographer, the mapping of Batavia, and the partial mapping of Mt. Morris. Mr. A. H. Bumstead, topographer, had charge of a party which completed the mapping of Copake quadrangle, and Mr. Hamilton of a party which secured control for Nineveh. In all there were nine parties in the field for the whole season, with a few others for short periods of time, engaged in work on twenty-six quadrangles.

The final topographic mapping was completed on fifteen sheets during the season, and the field work of surveying eleven others were well advanced. These maps represent the topography of twenty-six different counties; namely, Allegany, Broome, Cattaraugus, Chautauqua, Chenango, Cortland, Columbia, Delaware, Dutchess, Essex, Franklin, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Oneida, Oswego, Otsego, Schoharie, St. Lawrence, Steuben, Suffolk, Wyoming.

The resulting maps are being drawn up in office and preliminary photo-lithographic copies of the completed sheets will soon be ready for use.

The following tabular statement shows the net results of the field work of the various topographic parties:

COUNTIES.	Sheet.	Topographers.	Number of days worked.	Area mapped, square miles.	Triangulation locations, number.	Spirit Leveling.			Traverse, number miles.	Total cost, field work only.
						Bench marks, number.	Miles, number.	Elevations, number.		
Oneida, Lewis	Boonville	Jennings, Young	37	217	.....	....	.....	.....	50	$635
Jefferson, Lewis	Carthage	Jennings	48	215	127	5	141	425	326	1,550
Schoharie, Delaware	Hobart	Jennings, Hamilton	35	221	18	....	3	105	36	725
Chenango, Broome, Cortland	Greene	Jennings, Harper	62	221	141	1	139	469	570	1,885
Chenango, Broome	Bainbridge	Jennings, Whitman	45	221	164	....	139	355	589	1,435
Schoharie, Otsego	Richmondv'le	Bassett, Jennings	63	220	.....	2	97	316	.....	1,250
Greene, Wyoming	Batavia	Lovell, Roberts, Young	41	219	119	9	234	650	533	2,350
Livingston, Genesee, Wyoming	Caledonia	Roberts	47	219	98	6	208	528	528	1,500
Chautauqua	Chautauqua	Roberts	67	220	118	7	187	624	525	2,050
Livingston, Steuben	Wayland	Roberts	46	220	.....	....	.....	.....	154	700
Franklin, Essex	Saranac Lake	Smith, Slaughter, Harper	157	214	116	6	72	274	1,012	4,600
Franklin, Hamilton	Long Lake	Slaughter, Whitman	130	136	19	....	10	41	595	2,600
Suffolk	Setauket	Smith, Guerdrum, Hamilton	61	180	46	4	142	413	1,132	930
Suffolk	Fire Island	Smith	4	85	.....	....	.....	.....	5	190
Columbia, Dutchess	Copake	Bumstead	99	222	233	5	179	1,215	682	2,600
			942	3,030	1,199	45	1,551	5,415	6,737	$25,000
PARTLY SURVEYED.										
Lewis, Oswego, Jefferson	Highmarket	Jennings	.....	.....	.....	6	116	506	210	$1,020
Oswego, Jefferson	Orwell	Jennings	.....	.....	.....	9	130	376	278	555
Oneida, Lewis	Taberg	Jennings, Tufts	11	.....	84	7	138	428	471	1,120
Hamilton, Herkimer	Piseco Lake	Jennings	20	.....	146	4	67	395	154	1,130
St. Lawrence, Franklin, Hamilton, Herkimer	Tupper Lake	Smith, Tufts	18	.....	41	4	20	112	60	655
Franklin	St. Regis	Smith, Guerdrum, Slaughter, Whitman	52	46	69	1	55	142	331	2,120
Franklin	Loon Lake	Tufts	23	23	142	....	.....	.....	.....	375
Chautauqua	Clymer	Roberts	17	.....	105	7	192	420	477	1,350
Chautauqua, Cattaraugus	Falconer	Roberts	.....	.....	.....	6	157	360	28	830
Broome, Chenango	Nineveh	Hamilton	34	.....	178	2	20	312	220	620
Wyoming, Livingston, Allegany	Mt. Morris	Lovell	.....	.....	.....	3	7	30	40	225
			1,117	3,099	1,964	94	2,453	8,496	9,006	$10,000
Precise levels	....	Baldwin	.....	.....	.....	9	113	.....	.....	35,000
			.....	.....	.....	103	2,566	.....	.....	....

SPIRIT LEVELING.

Under the immediate direction of the various topographers ten parties were engaged in running spirit levels over the areas under survey. This was done to determine elevations and establish bench marks upon which to base the contour sketching of the area mapped. These levels were run with the greatest care and are all reduced to mean sea level. In the conduct of this work 2,453 miles of levels were run, and ninety-four permanent bench marks of bronze or aluminum established.

A descriptive list of the bench marks set in the course of the leveling is not appended as heretofore. These are being held up for publication in my next annual, by which time a final last square adjustment will have to be made of the precise level net of the entire State, through which all leveling will be reduced to a mean sea level datum.

SECONDARY LOCATIONS.

During the topographic mapping horizontal control was established by plane-table triangulation and road traverse. The positions of 1,964 points were accurately determined by trigonometric methods, the elevations of which were ascertained at the same time and in the same manner. In addition, 9,006 miles of road traverse were run, and from these were located by intersection 3,357 additional positions. The horizontal control of the maps completed averaged approximately one trigonometric location and one spirit-level elevation to every two square inches of map, and two miles of road traverse per square inch of map.

LAND CLASSIFICATION MAPS.

The usual manuscript maps showing portions of the mapped areas covered by timber, brush and cultivated crops, with appended statements of the kinds and percentages of the various woods and crops have been prepared.

OFFICE WORK, 1901–2.

During the office season of 1901-2, all of the atlas sheets completely mapped during the preceding season were drawn up and turned over to the engraver for publication. These are yet in the hands of the engraver and include the following fourteen sheets, representing an area of 2,935 square miles:

SHEET NAME.	Counties.	Area square miles.
Apalachin	Broome. Tioga	224
Babylon	Suffolk, Queens	125
Big Moose	Herkimer, Hamilton	216
Binghamton	Broome	224
Gilboa	Schoharie, Delaware. Greene	221
Gloversville	Hamilton, Fulton	218
Harford	Cortland, Tioga, Broome	220
Honeoye	Monroe, Ontario, Livingston	219
Lassellsville	Herkimer, Hamilton, Fulton	218
Margaretville	Delaware, Ulster, Greene	222
Northport	Suffolk, Queens	170
Pitcher	Cortland, Madison, Chenango	220
Rosendale	Ulster	223
Santanoni	Franklin, Essex	215
Total		2,935

BEING ENGRAVED.

In addition there remain in the hands of the engravers the following sixteen atlas sheets, mapped in 1900-1901, all of which will soon be ready for publication and issuance:

SHEET NAME.	Counties.	Area square miles.
Alexandria Bay	Jefferson, St. Lawrence	134
Berne	Schoharie, Albany	220
Blue Mountain	Hamilton, Essex	216
Canandaigua	Ontario, Monroe	219
Cortland	Cortland	220
Hammondsport	Schuyler, Steuben, Yates	221
Kinderhook	Columbia, Rensselaer	221
Luserne	Warren, Saratoga	217
Naples	Livingston, Yates, Steuben	220
Norwich	Chenango, Madison	220
Owego	Tioga	223
Penn Yan	Yates, Steuben	220
Phœnicia	Ulster, Greene	222
Raquette Lake	Hamilton	215
Richfield Springs	Montgomery, Otsego, Herkimer	219
Theresa	Jefferson	215
Total		3,422

PUBLISHED SHEETS.

At the time my last annual report was submitted there had been published 106 atlas sheets by the office of the United States Geological Survey, covering a total area of 19,048 square miles. Since then there has been completed by the engraving division of the above Survey eighteen additional sheets, as enumerated in the following list, thus making the total number of sheets published, 124, and the total published area, 22,206 square miles.

SHEET NAME.	Counties.	Area square miles.
Broadalbin	Fulton, Saratoga, Hamilton	218
Clayton	Jefferson	202
Clyde	Wayne, Seneca	218
Geneva	Ontario, Seneca	219
Genoa	Seneca, Cayuga, Tompkins	220
Grindstone	Jefferson	24
Millbrooik	Dutchess	223
Morrisvlle	Madison, Oneida	219
*Navesink	New York	1
Newburg	Ulster, Orange	223
Ovid	Yates, Seneca	220
Palmyra	Wayne, Ontario	218
Phelps	Ontario, Yates	219
Pultneyville	Wayne	36
Saratoga	Saratoga	218
Sodus Bay	Wayne	40
Waverly	Chemung, Tioga	222
Weedsport	Wayne, Cayuga	218
Total		3,158

*Reduction of four sheets, Sandy Hill, New Brunswick, Cassville, Asbury Park, scale 1:125,000, about 2 miles to 1 inch.

The engraving, printing, issuance and sale of these maps is done exclusivly at the expense of and by the United States Geological Survey. Such limited number of proofs as may be required by the office of the State Engineer are furnished for his use. Persons desiring these maps can obtain them by addressing the Director of the United States Geological Survey, at Washington, D. C., and enclosing five cents per copy, or at the rate of two dollars per hundred. Upon the accompanying progress map is indicated such portions of the State as have been surveyed, including all those which are not engraved and published.

TRIANGULATION OF 1901.

During the first half of the season of 1901, Mr. E. L. McNair, topographer, was engaged in extending triangulation over a portion of the southern Adirondacks, and during the remainder of the season over the northwestern part of the same region. He established and marked the positions of thirty-five stations, which control nine fifteen minute quadrangles, covering portions of Fulton, Hamilton, St. Lawrence, Franklin, Saratoga and Warren counties. He also established a meridian line at Johnstown.

FRAKNLIN COUNTY.

Desaw.— Situated about two miles east of Dickinson Center, on a large rock in field owned by Fred Desaw.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 43′ 12.69″. Longitude, 74° 30′ 53.14″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Nierny	55 51 07.54	235 40 10.66	4.3963093
White Hill	56 57 42.16	236 46 41.90	4.3929324
Norwood	97 43 33.65	277 24 10.29	4.5644263
Azure	356 54 38.76	176 55 12.93	4.2993577

Iron.—A secondary station situated on the eastern side and 150 feet below summit of a high timbered mountain in Altamont township, about three miles, air line, south of Derrick station, on New York and Ottawa Railroad.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: The spruce signal tree; true azimuth to same, 283° 50′; distance, 7.15 feet.

Latitude, 44° 19′ 14.2″. Longitude, 74° 28′ 56.3″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
St. Regis	231 03 17	51 09 40	4.19284
Morris	358 17 47	178 18 04	4.25234

Kildare.— A secondary station, situated at the western end of a high timbered mountain in Altamont Township, about three miles south of Derrick station, on the New York and Ottawa Railroad.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: Spruce signal tree; true azimuth, 160° 35′; distance, 22 feet.

Latitude, 44° 19′ 09.9″. Longitude, 74° 29′ 26.1″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Little Blue	98 36 44	278 22 57	4.42298
Panther	119 15 47	299 04 36	4.38590
Azure	178 01 48	358 01 22	4.39190

FULTON COUNTY.

Pinnacle.— Situated on a round timbered knob, partly cleared, in northern part of town of Bleecker.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 43° 13′ 04.16″. Longitude, 74° 23′ 20.69″.

To station.	Azimuth.	Back azimuth.	Log. dist. meters.
	° ′ ″	° ′ ″	
Blue Ridge	169 12 05.03	349 11 27.46	3.8195692
Cathead	228 00 57.24	48 05 03.62	4.0376901
Sacandaga	266 31 33.43	86 38 18.76	4.1265109

Sacandaga.— Situated on a partially cleared mountain about two miles west of Northville.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 43° 13′ 30.01″. Longitude, 74° 13′ 28.84″.

To station.	Azimuth.	Back azimuth.	Log. dist. meters.
	° ′ ″	° ′ ″	
Pinnacle	86 38 18.76	266 31 33.43	4.1265109
Blue Ridge	111 21 13.89	291 13 50.76	4.1947207
Cathead	141 07 12.81	321 04 33.64	3.9213483
Buck	208 18 19.47	28 21 41.06	4.1452430

Stratford.— A secondary station, situated on a low, bare knoll about one-fourth mile northeast of town of Stratford.

Station mark: A lone poplar tree nine inches in diameter and twelve feet high.

Reference mark: A bowlder 3 by 3 by 3 feet, distant 55½ feet from station mark; true azimuth from mark, 127° 50′.

Latitude, 43° 11′ 06.2″. Longitude, 74° 41′ 29.9″.

To station.	Azimuth.	Back azimuth.	Log. dist. meters.
	° ′ ″	° ′ ″	
Barto	69 30 56	249 22 48	4.23658
Oak Hill	127 50 22	307 48 57	3.54610
West Creek No. 2	180 40 23	0 40 28	4.09602
Tomany	221 15 05	41 19 56	4.16090

HAMILTON COUNTY.

Blue Ridge.— Situated on a partly cleared, timbered ridge in town of Benson, about five miles west of Benson Center.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 43° 16′ 34.25″. Longitude, 74° 24′ 15.54″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Tomany . .	93 12 48.07	273 05 49.33	4.1396657
West Creek No. 1	96 13 18.13	276 01 29.29	4.3699741
Twin Lake No. 2	142 30 55.00	322 23 31.00	4.37794
Twin Lake No. 1	144 02 51.76	323 55 50.84	4.3706853
Hamilton . .	191 26 40.71	11 28 13.64	4.1861832
Buck . .	252 35 27.24	72 46 12.52	4.3465601
Cathead . .	265 01 18.09	85 06 02.20	3.9721603
Sacandaga . .	291 13 50.76	111 21 13.89	4.1947207
Pinnacle . .	349 11 27.46	169 12 05.08	3.8195692

Buck.— Situated on a cleared mountain about four miles northeast of Hope Falls, Hamilton county, and near the Saratoga-Hamilton county line.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 43° 20′ 08.51″. Longitude, 74° 08′ 34.75″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Sacandaga .	28 21 41.08	208 18 19.47	4.1452430
Cathead . .	63 58 35 96	243 52 34.91	4.1207917
Blue Ridge	72 46 12.52	252 35 27.24	4.3465601
Hamilton . .	115 01 25.72	294 52 12.62	4.3009785
Mill Creek	200 27 17.27	20 31 15.56	4.3478133
Bald Head	221 34 28.11	41 41 42.84	4.3309793
Wells . .	251 41 36.93	71 48 41.35	4.1661306

Cathead.— Situated in town of Benson, about one mile north of Benson post-office, on a burnt, rocky hill.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: A dead tree used as signal; distant 33.3 feet, true azimuth, 89° 09′ from mark.

Latitude, 43° 17′ 04.42″. Longitude, 74° 17′ 21.12″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Pinnacle .	48 05 03.62	228 00 57.24	4.0376901
Blue Ridge	85 06 02.20	265 01 18.09	3.9721603
Hamilton . .	156 12 45.49	336 09 33.96	4.1921313
Speculator . .	168 06 57	348 04 51	4.30218
Buck . .	243 52 34.91	63 58 35.96	4.1207917
Sacandaga . .	321 04 33.64	141 07 12.81	3.9213483

Fish (not occupied).— A secondary point situated on a bare hill, about two miles west of Lake Pleasant. Probably a station of the Colvin Survey.

Latitude, 43° 28′ 18.1″. Longitude, 74° 27′ 36.3″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Tomany	23 48 26	203 43 45	4.35993
West Creek No. 1	44 22 14	224 12 42	4.42900
Twin Lake No. 1	73 38 08	253 33 23	3.98512
Hamilton	311 24 58	131 28 50	4.00363

Hamilton.— A United States Coast and Geodetic Survey triangulation station, situated on a high cleared mountain about three miles south of Lake Pleasant.

Station mark: A copper bolt set in solid rock and marked "U. S. G. S. 465 N. Y.," near which is a United States Coast and Geodetic Survey copper bolt, not marked.

Latitude, 43° 24′ 41.82″. Longitude, 74° 22′ 00.14″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Blue Ridge	11 28 13.64	191 26 40.71	4.1861832
Tomany	49 42 09.98	229 33 37.78	4.3435825
West Canada	113 22 30.27	293 07 42.24	4.3994236
Little Moose	150 10 42.30	330 02 15.89	4.5200577
Snowy	177 03 15.52	357 02 24.76	4.5065186
Big Range	206 09 35.82	26 14 31.60	4.3397301
Gore	221 33 38.32	41 46 44.82	4.5860772
Mill Creek	244 14 46.95	64 27 59.47	4.4582536
Crane	245 28 19.04	65 44 59.34	4.5547813
Prospect	268 28 38.73	88 53 20.26	4.6858085
Wells	276 42 21.77	96 58 39.81	4.5087915
Buck	294 52 12.62	115 01 25.72	4.3009785
Cathead	336 09 33.96	156 12 45.49	4.1921313

Speculator (not occupied).— A secondary point situated on a partly timbered mountain about three miles south of Speculator. Probably a station of the Colvin Survey.

Latitude, 43° 27′ 36.2″. Longitude, 74° 20′ 24.8″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Hamilton	21 43 39	201 42 34	3.76294
Twin Lake No. 1	85 45 06	265 35 26	4.27932
Cathead	348 04 51	168 06 57	4.30218

Tomany.— Situated in the town of Arietta about four miles northwest of Arietta, on a timbered mountain about one and a half miles west of highway leading to Piseco Lake. Summit of mountain has been cleared. Theodolite was supported on a beech tree sawed off twenty-five feet above ground, around which was built a tower and platform.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: The beech signal tree twenty feet distant; true azimuth, 156° 26′ from mark.

Latitude, 43° 16′ 58.85″. Longitude, 74° 34′ 26.34″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Stratford . .	41 19 55	221 15 05	4.16090
Oak Hill	54 46 05	234 39 50	4.17918
Barto . .	56 43 04	236 30 05	4.48817
West Creek No. 2	99 38 32.33	279 33 46.34	3.9793818
West Creek No. 1	100 23 16.70	280 18 26.65	3.9864913
Twin Lake No. 2	177 29 49	357 29 25	4.25977
Twin Lake No. 1	179 50 28.83	359 50 27.30	4.2608692
Fish .	203 43 45	23 48 26	4.35993
Hamilton . .	229 33 37.78	49 42 09.98	4.3435825
Blue Ridge	273 05 49.33	93 12 48.07	4.1396657

Twin Lake No. 1.— Situated in Arietta Township about four miles west of Piseco Lake on the east edge of a timbered mountain.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 43° 26′ 49.68″. Longitude, 74° 34′ 28.58″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
West Creek No. 2	29 20 23.69	209 15 38.81	4.2806716
West Creek No. 1	29 54 43.63	209 49 54.68	4.2791890
Fish .	253 33 23	73 38 08	3.98512
Speculator .	265 35 26	85 45 06	4.27932
Hamilton .	283 07 12.71	103 15 47.23	4.2378111
Blue Ridge	323 55 50.84	144 02 51.76	4.3706853
Tomany .	359 50 27.30	179 50 28.83	4.2608692

Twin Lake No. 2.— A secondary point situated in Arietta Township, about four miles west of Piseco Lake, on west end of a timbered mountain.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 43° 26′ 47.6″. Longitude, 74° 35′ 01.7″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Blue Ridge	322 23 31	142 30 55	4.37794
Tomany . .	357 29 25	177 29 49	4.25977

West Creek No. 1.— Situated on the northwest end of a narrow ridge about one-fourth mile long in the southern part of Hamilton county, about three miles west of the Powley place, on the road from Stratford to Piseco Lake.

Station mark: A copper bolt set in solid rock and marked U. S. G. S. N. Y. 486."

Reference mark: The spruce signal tree twenty-seven feet distant from station mark; true azimuth, 328° 40′.

Latitude, 43° 17′ 55.27″. Longitude, 74° 41′ 29.34″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Schuyler	66 25 45.00	246 08 31.00	4.57643
Cold Brook	80 00 51.00	259 48 45.00	4.41872
Pen	101 13 36.00	280 50 11.00	4.67191
Twin Lake No. 1	209 49 54.68	29 54 43.63	4.2791890
Fish	224 12 42.00	44 22 14.00	4.42900
Hamilton	244 24 39.65	64 38 02.33	4.4648879
Blue Ridge	276 01 29.29	96 13 18.13	4.3699741
Tomany	280 18 26.65	100 23 16.70	3.9864913

West Creek No. 2.— Situated on the southeast end of a narrow ridge about one-fourth mile long in the southern part of the county, about three miles west of the Powley place, on road from Stratford to Piseco Lake.

Station mark: A bronze triangulation tablet set in solid rock.

Reference mark: The spruce signal tree 13.65 feet distant from station mark; true azimuth, 350° 46′.

Latitude, 43° 17′ 50.40″. Longitude, 74° 41′ 23.42″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Stratford	0 40 28.00	180 40 23.00	4.09602
Twin Lake No. 1	209 15 38.81	29 20 23.69	4.2806716
Hamilton	244 01 54.16	64 15 12.76	4.4640717
Tomany	279 33 46.34	99 38 32.33	3.9793818

HERKIMER COUNTY.

Oak Hill.— A secondary station situated on the eastern side of a timbered mountain, about two miles northwest of Stratford.

Station mark: An ash tree fourteen inches in diameter.

Latitude, 43° 12′ 16.1″. Longitude, 74° 43′ 32.9″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Tomany	234 39 50	54 46 05	4.17918
Stratford	307 48 57	127 50 22	3.54610

ST. LAWRENCE COUNTY.

Arab.— A secondary station situated on a partly cleared mountain about one and a half miles east of Childwold station, on New York Central Railroad.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 12′ 16.8″. Longitude, 74° 35′ 20.5″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Wheeler	73 01 01	252 58 32	3.69594
Moosehead	144 02 04	323 58 00	4.11987
Morris	298 46 37	118 51 21	4.01481

Beech Plains Church (not occupied).— Secondary point situated in town of Pierrepont.

Station mark: Tower of church.

Latitude, 44° 30′ 45.4″. Longitude, 75° 04′ 23.0″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
McCarthy	254 56 52	75 05 19	4.21820
Stark	307 22 34	127 27 07	4.03564

Canton Water Tower (not occupied).— Secondary point.

Station mark: Center of water tower.

Latitude, 44° 35′ 41.4″. Longitude, 75° 09′ 47.3″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
White Hill	269 04 32	89 20 51	4.48811
McCarthy	281 47 02	101 59 17	4.37320
Fike	295 20 25	115 34 54	4.48160
Stark	314 51 05	134 59 26	4.34790

Fike.— Situated on a high, bare knob in southwest corner of town of Parishville, on land owned by Benjamin Fike, who lives about fifty rods north of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 28′ 39.21″. Longitude, 74° 49′ 07.84″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Little Blue	0 03 09.92	180 03 09.52	4.1354408
Stark	76 56 55.90	256 50 48.11	4.0761604
McCarthy	153 33 33.08	332 31 18.37	3.9639417
White Hill	194 17 03.42	14 18 52.38	4.1425627
Nierny	195 15 38.27	15 17 30.62	4.1278494
Azure	254 15 12.54	74 28 34.06	4.4187160
Panther	319 15 13.24	139 17 49.21	3.8778808
Moosehead	331 39 39.01	151 45 13.51	4.3488909

Little Blue.— Situated on a rocky knob (nearly cleared) in southeast corner of town of Granshur, at the headwaters of the middle fork of the Grasse River. Best reached from the camp of the "Hollywood Club," on Clear Pond, two miles distant.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 21′ 16.67″. Longitude, 74° 49′ 08.41″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Stark	133 24 22.24	313 18 15.25	4.2030889
McCarthy	169 02 09.28	348 59 55.15	4.3470034
Fike	180 03 09.52	360 03 09.92	4.1354408
Panther	211 53 07.12	31 55 43.33	3.9708924
Azure	230 33 17.90	50 46 38.93	4.5145711
Moosehead	299 27 32.55	119 33 07.08	4.0859436
Morris	308 10 34.15	128 24 56.78	4.5432946

McCarthy.— Situated on a partly cleared hill about three miles east of Colton, in town of Colton, on land owned by Mr. McCarthy, who lives about one-half mile west of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 33′ 03.78″. Longitude, 74° 52′ 19.98″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Stark	34 07 11.76	214 03 18.41	4.1180159
Norwood	161 11 43.05	341 07 25.93	4.3972766
Nierny	238 22 01.19	58 26 08.45	3.9603360
Azure	272 00 13.36	92 15 50.18	4.4698326
Fike	332 31 18.37	152 33 33.08	3.3639417
Little Blue	348 59 55.15	169 02 09.28	4.2030889

Moosehead.— Situated on a cleared mountain in Jamestown Township, on south side of Raquette River, about one and one-half miles northeast of Sevey post-office.

A signal of New York State land survey is on same mountain, about 500 feet distant.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 18′ 02.19″. Longitude, 74° 41′ 09.67″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Little Blue	119 33 07.08	299 27 32.55	4.0859436
Fike	151 45 13.51	331 39 39.01	4.3488309
Panther	157 56 32.83	337 53 34.22	4.1773993
Azure	208 46 02.30	28 53 47.36	4.4844536
St. Regis	246 56 14.88	67 11 10.66	4.4887547
Morris	312 52 57.88	133 01 46.12	4.3610592

Nierny.— Situated on a bare knoll about three miles southeast of Parishville, on land owned by Mr. Nierny, who lives about 200 yards south of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 35′ 38.71″. Longitude, 74° 46′ 27.66″.

To station.	Azimuth.	Back azimuth.	Log. dist. meters.
	° ′ ″	° ′ ″	
Fike	15 17 30.62	195 15 38.27	4.1278494
Stark	44 06 11.35	223 58 10.86	4.3378501
McCarthy	58 26 08.45	238 22 01.19	3.9603360
Norwood	140 03 24.73	319 54 59.79	4.3909593
Desaw	235 40 10.66	55 51 07.54	4.3963093
Azure	285 04 14.54	105 15 44.47	4.3517520

Norwood.— Situated on a low, sandy knoll about one mile north of Norwood.

Station mark: A flat stone about 30 inches square and eight inches thick, in the top of which is cemented a bronze triangulation tablet.

Latitude, 44° 45′ 49.12″. Longitude, 74° 58′ 25.85″.

To station.	Azimuth.	Back azimuth.	Log. dist. meters.
	° ′ ″	° ′ ″	
Desaw	277 24 10.29	97 43 33.65	4.5644263
Azure	303 14 16.51	123 34 12.20	4.6523077
White Hill	319 20 20.50	139 28 42.10	4.3828385
Nierny	319 54 59.79	140 03 24.73	4.3909593
McCarthy	341 07 25.93	161 11 43.05	4.3972766
Stark	358 47 24.30	178 47 47.41	4.5378178

Panther.— Situated on a cleared mountain, locally known as Catamount Mountain, on the west side of the Raquette river, about three miles southeast of the Stark post-office, and about twenty minutes walk from the main highway.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: New York State land survey signal and station mark distant 3.05 feet; true azimuth, 308° 04′ from station.

Latitude, 44° 25′ 33.86″. Longitude, 74° 45′ 25.09″.

To station.	Azimuth.	Back azimuth.	Log. dist. meters.
	° ′ ″	° ′ ″	
Little Blue	31 55 43.33	211 53 07.12	3.9708924
Stark	100 25 11.81	280 16 28.25	4.2255977
Fike	139 17 49.21	319 15 13.24	3.8778808
Azure	237 45 17.54	57 46 02.60	4.3807413
St. Regis	273 06 10.88	93 24 06.43	4.5321790
Morris	322 42 42.45	142 54 29.66	4.5698926
Moosehead	337 53 34.22	157 56 32.83	4.1773993

Potsdam Presbyterian Church (not occupied).— Secondary point situated in town of Potsdam.

Station mark: Center of church tower.

Latitude, 44° 40′ 12.5″. Longitude, 74° 58′ 52.9″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
White Hill	295 53 22	116 02 02	4.25889
McCarthy	326 45 07	146 49 43	4.19915
Stark	356 51 02	176 51 44	4.38271
Nierny	297 09 19	117 18 03	4.26655

Rogers (not occupied).— Secondary point situated on a low, bare hill in town of Norfolk, about one-half mile southwest of Plum Brook station, on Rome, Watertown and Ogdensburg division of New York Central and Hudson River Railroad. The land is owned by W. H. Rogers, who lives about fifty rods northeast of station.

Station mark: The elm signal tree, about fifteen inches in diameter.

Latitude, 44° 49′ 41.6″. Longitude, 74° 55′ 54.8″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Norwood	24 51 09	204 49 23	3.89793
Nierny	334 18 43	154 25 22	4.46025
McCarthy	351 14 53	171 17 24	4.49360

Stark.— Situated on a timbered ridge in northeast corner of the Town of Clare, on the west side of the North Branch of the Grasse River, on land owned by Irving Stark.

Theodolite elevated fifty-two feet on a tower built around trunk of a beech tree.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference marks: Center of signal tower and tree 46.3 feet distant; true azimuth, 238° 12′. Nail in top of stump of beech tree distant 75.4 feet; true azimuth, 355° 16′ from station.

Latitude, 44° 27′ 11.69″. Longitude, 74° 57′ 52.90″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Norwood	178 47 47.41	358 47 24.30	4.5378178
McCarthy	214 03 18.41	34 07 11.76	4.1180159
White Hill	222 51 17.55	42 59 14.67	4.3436695
Nierny	223 58 10.86	44 06 11.35	4.3378501
Fike	256 50 48.11	76 56 55.90	4.0761604
Panther	280 16 28.25	100 25 11.81	4.2255977
Little Blue	313 18 15.25	133 24 22.24	4.2030889

Wheeler (not occupied).— Secondary point situated on a low mountain partly burned over, three miles, air line, southwest of Arab Mountain. Timber on north side of mountain.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 11′ 29.7″. Longitude, 74° 38′ 54.3″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Arab	252 58 32	73 01 01	3.69594
Morris	284 17 31	104 24 44	4.15417

White Hill.— Situated on a bare knoll about three miles southeast of Parishville, on land owned by Welch Brothers, who live about forty rods southeast of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

Latitude, 44° 35′ 55.12″. Longitude, 74° 46′ 32.50″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Pike	14 18 52.38	194 17 03.42	4.1425627
Stark	42 59 14.67	222 51 17.55	4.3436695
Norwood	139 28 42.10	319 20 20.50	4.3828385
Desaw	236 46 41.90	56 57 42.16	4.3929324
Azure	286 14 01.09	106 25 34.44	4.3563551

SULLIVAN COUNTY.

Roads.— In Mamakating Township, on a high brushy ridge, three miles west of Westbrookville, a station on the Port Jervis, Monticello and New York Railroad.

Station mark: A bronze triangulation tablet set in bowlder thirty by eighteen by eighteen inches, above which was built a mound of stone three feet high with four feet base.

Reference marks: Arrow cut in flat rock four by three feet and one foot above ground; azimuth, 91°; distance, 32.86 feet. Arrow cut in bowlder four by three feet and two feet above ground; azimuth, 347°; distance, 25.57 feet.

Latitude, 41° 32′ 09.44″. Longitude, 74° 37′ 27.97″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
High Point	7 29 02.6	187 27 33.4	4.3817799
Wolf	205 58 43.1	25 55 18.2	3.8809053
Sams Point	235 59 37.5	56 10 16.9	4.4292886
Vernon	285 38 24.0	105 42 44.9	3.9765996
Writer	338 27 00.6	158 28 59.5	4.0548316

WARREN COUNTY.

Mill Creek.— On the west side of Mill Creek pond, in Lot 16, in Town of Thurman, on a high, burned-over mountain, having numerous dead trees still standing. The land belongs to the State.

Station mark: A one-inch hole drilled two and one-half inches deep in highest part of solid rock.

Reference mark: A dead spruce tree used as signal; distance, eighteen feet four inches; true azimuth, 32° 28′ from mark.

Latitude, 43° 31′ 24.63″. Longitude, 74° 02′ 48.13″.

To station.	Azimuth. ° ′ ″	Back azimuth. ° ′ ″	Log. dist. meters.
Buck . .	20 31 15.55	200 27 17.27	4.3478133
Hamilton . .	64 27 59.47	244 14 46.95	4.4582536
Crane . .	250 35 57.01	70 39 24.86	3.8562727
Bald Head	307 00 56.45	127 04 13.38	3.9059145
Wells . .	339 24 18.46	159 27 25.25	4.2401419

MERIDIAN MARKS.

JOHNSTOWN, FULTON COUNTY.

Location of station: On line of outer race-track fence, east of main entrance to track. On the grounds of the Fulton County Agricultural Society.

Station mark: A marble post 36 by 6 by 6 inches, set 35 inches in the ground, in the center of top of which is cemented a bronze meridian tablet.

Distant mark: North of station 448 feet and 3 feet outside of outer race-track fence. A marble post 38 by 6 by 6 inches, set 36 inches in the ground, in the center of top of which is cemented a bronze meridian tablet.

Local referee: John F. Campbell, city engineer's office.

Index of Hydrographs Accompanying Report on New York Stream Gaugings, 1902.

Stream.	Station.	Years.	After page.
Black River	Huntingtonville dam	'97,'98,'99,'00,'01	36
Cayadutta Creek	Johnstown	'98,'99,'00	168
Chittenango Creek	Bridgeport	'98,'99,'00,'01	56
East Canada Creek	Dolgeville	'98,'99,'00,'01,'02	157
Fish Creek (West Br.)	McConnellsville	'98,'99,'00,'01	47
Hudson River	Ft. Edward	'95,'96,'97,'98,'99,'00,'01,'02	242
Hudson River	Mechanicville	'98,'99,'00,'01,'02	247
Kinderhook Creek	East Nassau	'92,'93	255
Mohawk River	Dunsbach Ferry	'02	196
Mohawk River	Little Falls	'98,'99,'00,'01,'02	162
Mohawk River	Rexford Flats	'98,'99,'00,'01	190
Mohawk River	Ridge Mills	'98,'99,'00	119
Mohawk River	Schenectady	'99,'00,'01	184
Mohawk River	Utica	'02	135
Norman's Kill	French's Mills	'91	257
Oneida Creek	Kenwood	'98,'99,'00	51
Oriskanv Creek	Oriskany	'98,'99,'00	122
Oswego River	above Minetto	'00,'01,'02	87
Oswego River	High Dam	'97,'98,'99,'00,'01	95
Quackenkill Creek	Quackenkill	'94	251
Richelieu River	Chambly, P. Q	'02	110
Sauquoit Creek	New York Mills	'98,'99,'00	130
Schoharie Creek	Fort Hunter	'98,'99,'00,'01	174
Schoharie Creek	Schoharie Falls	'01	178
Schroon River	Warrensburg	'95,'96,'97,'98,'99,'00,'01,'02	237
Seneca River	Baldwinsville	'99,'02	81
Skaneateles Outlet	Willow Glen	'96,'97,'98,'99,'00 '01,'02	73
Wallkill River	New Paltz	'01	279
West Canada Creek	Middleville	'98,'99,'00,'01	148

Index of Illustrations Accompanying Report on New York State Stream Gaugings, 1902.

Stream.	Subject.	Facing page.
Black River	Dam at Felt's Mills	38
Catskill Creek	Kaaterskill Falls	278
Catskill Creek	Water analysis	326
Chenango River	Binghamton Dam	310
Current Meter		18
East Canada Creek	Upper Falls and dam	152
East Canada Creek	Beardslee Falls and Power-house	152
Esopus Creek	Saugerties dam	266
Esopus Creek	Saugerties dam	266
Esopus Creek	Water analysis	326
Fishkill Creek	Water analysis	326
Gauge details		88
Gauging Stations map	Areas	340
Genesee River	Lower Falls	98
Housatonic River	Bull's Falls	306
Housatonic River	Water analysis	326
Mohawk River	Dunsbach Ferry Dam	192
Mohawk River	Cohoes Falls	214
Oswegatchie River, East Br.	Newton Falls	104
Oswego River	Cable station, above Minetto	90
Oswego River	High Dam	90
Raquette River	Hannawa Falls	104
Raquette River	Higley Falls	106
Raquette River	Upper Falls, Colton	106
Reel's Creek	Gauging weir	136
Reel's Creek	Gauging weir details	138
Reel's Creek	Rainfall and run-off	140
Rondout Creek	Water analysis	326
Salmon River	Falls (undeveloped)	42
Ten-Mile River	Water analysis	326
Vertical velocity curves	Comparisons	340
Wallkill River	Wallkill Dam	278
Wallkill River	Water analysis	326

Index of Streams and Gauging Stations, 1902.

Stream.	Place.	County.	No. on Map.	Page.
Beaver River	Tisse's Bridge	Lewis	43	27
Black River	Felt's Mills	Jefferson	7	37
Black River	Huntingtonville Dam	Jefferson	6	31
Black River	Watertown	Jefferson	6	31
Byram River	Glenville	Connecticut	58	New sta.
Byram River, E. branch	Greenwich	Connecticut	59	New sta.
Byram River, W. branch	Portchester	Westchester	60	New sta
Catskill Creek	South Cairo	Greene	32	260
Cayadutta Creek	Johnstown	Fulton	47	166
Chenango River	Binghamton	Broome	9	309
Chittenango Creek	Bridgeport	Madison	40	52
Chittenango Creek	Chittenango	Madison	41	57
Croton River	Croton Dam (old)	Westchester	39	290
Delaware River	Lambertsville, N. J.		50	323
Delaware River, E. branch	Hancock	Delaware	54	320
Delaware River, W. branch	Hancock	Delaware	55	319
East Canada Creek	Dolgeville	Herkimer	17	150
Esopus Creek	Kingston	Ulster	33	264
Fishkill Creek	Glenham	Dutchess	45	284
Fish Creek W. branch	McConnellsville	Oneida	48	44
Honeoye Creek	East Rush	Monroe	56	New sta.
Housatonic River	Gaylordsville	Connecticut	38	304
Hudson River	Fort Edward	Saratoga	22	238
Hudson River	Mechanicville	Saratoga	29	243
Indian River	Indian Lake Dam	Hamilton	20	230
Kinderhook Creek	East Nassau and Wilson's dam	Rensselaer	31	252
Lake Champlain Outlet	Chambly	P. Q	46	108
Lake Champlain Outlet	Fort Montgomery	Clinton	46	107
Mianus River	Bedford	Westchester	62	New sta.
Mianus River	Stamford	Connecticut	61	New sta.
Mohawk River	Dunsbach Ferry	Saratoga	28	192
Mohawk River	Little Falls	Herkimer	18	158
Mohawk River	Rexford Flats	Saratoga	27	186
Mohawk River	Ridge Mills	Oneida	12	116
Mohawk River	Schenectady	Schenectady	26	182
Mohawk River	Utica	Oneida		
Moose River	Moose River	Lewis	44 (*a*)	25
Neversink River	Port Jervis	Orange	49	324
Norman's Kill	French's Mill	Albany	30	256
Oneida Creek	Kenwood	Madison	42	49
Oneida River	Brewerton	Onondaga	5	82
Oneida River	Oak Orchard	Onondaga	52	83
Oriskany Creek	Oriskany State dam ; Wood Road Bridge	Oneida	13	120
Oswego River	Fulton	Oswego	2 (*c*)	84
Oswego River	High Dam	Oswego	2 (*a*)	91

Stream.	Place.	County.	No. on Map.	Page.
Oswego River	Minetto	Oswego	2 (*b*)	86
Quackenkill	Quackenkill	Rensselaer	51	249
Ramapo River	Two Bridges	N. J.	57	New sta.
Raquette River	Hannawa Falls	St. Lawrence	19	106
Richelieu River	Fort Montgomery	Clinton	46	107
Rondout Creek	Honk Falls	Ulster	34	276
Rondout Creek	Rosendale	Ulster	35	271
Sauquoit Creek	N. Y. Mills and Yorkville	Oneida	14	128
Salmon River	Pulaski	Oswego	8	39
Seneca River	Baldwinsville	Onondaga	3	77
Schoharie Creek	Fort Hunter dam	Montgomery	24	169
Schoharie Creek	Mill Point and Aqueduct	Montgomery	23	175
Schoharie Creek	Prattsville	Greene	53	181
Schoharie Creek	Schoharie Falls	Montgomery	25	177
Schroon River	Warrensburg	Warren	21	234
Skaneateles Outlet	Willow Glen and Jordan	Onondaga	4	61
Susquehanna River	Binghamton	Broome	10	313
Ten Mile River	Dover Plains	Dutchess	37	300
Wallkill River	New Paltz	Ulster	36	278
West Canada Creek	Twin Rock bridge	Oneida	11	142

INDEX OF SUPPLEMENT

TO THE

ANNUAL REPORT OF THE STATE ENGINEER AND SURVEYOR OF NEW YORK, 1902.

PAGE.

- Beaver River:
  - Tisse's Bridge, Lewis county 27
    - Discharge 31
    - Gauge readings 30
- Beardslee Falls, East Canada Creek:
  - Views of, facing 152
- Black River:
  - Felt's Mills, Jefferson county 37
    - Discharge 39
    - Gauge readings 38
    - Run-off 38
    - View of, facing 38
  - Huntingtonville Dam, Jefferson county 31
    - Discharge 33
    - Hydrographs 36
    - Run-off 36
- Catskill Creek 260
  - Discharge 263
  - Drainage area 258
  - Water analysis 326, 329
  - Water powers 262
- Cayadutta Creek:
  - Johnstown, Fulton county 166
    - Discharge 167
    - Hydrographs 168
    - Run-off 169
- Champlain, Lake outlet:
  - Richelieu River 107
- Chenango River:
  - Binghamton, Broome county 309
    - Discharge 310
    - Drainage areas 311
    - View of, facing 310

Chittenango Creek: PAGE.
  Bridgeport, Madison county 52
    Discharge 55
    Hydrographs 56
    Run-off 57
  Chittenango, Madison county 57
    Discharge 58
    Water powers 61

Clove Creek, Dutchess county:
  Discharge of 287
Co-operative Survey of State 9, 341
  Appropriation for 343
  Franklin county 353
  Fulton county 354
  Hamilton county 354
  Herkimer county 358
  Land maps 350
  Leveling 350
  Meridians 364
  Plans 345
  Progress 342
  Results 10, 344, 346
  St. Lawrence county 359
  Sheets in progress 351
  Sullivan county 363
  Triangulation 352
  Value of 9
  Warren county 364

Croton River:
  At Old Croton Dam, Westchester county 290
    Discharge 294
    Rainfall 298
    Reservoirs 292
    Run-off 299
Current meters 17
    Methods of use 18

Delaware River:
  East branch, at Hancock, Delaware county 320
    Discharge 321
  West branch, at Hancock, Delaware county 319
    Discharge 320
    Gauge 319
  At Port Jervis, Orange county 322
    Discharge 323
    Drainage area 323
Discharge, daily 22

PAGE.

- East Canada Creek:
  - Dolgeville, Herkimer county:
    - Discharge 152
    - Hydrographs 157
    - Run-off 158
    - Typical development 153
    - Views of, facing 152
    - Water powers 152, 153
- Esopus Creek:
  - At Kingston, Ulster county 264
    - Discharge 266
    - Drainage areas 267
    - Gauging station 265
    - Views of, facing 266
    - Water analysis 326, 330
    - Water powers 269
- Fish Creek, West branch:
  - McConnellsville, Oneida county 44
    - Discharge 46
    - Floods 45
    - Hydrographs 47
    - Run-off 48
    - Water powers 48
- Fishkill Creek:
  - At Glenham, Dutchess county 284
    - Discharge 286, 289
    - Floods 286, 287
    - Water analysis 326, 337
    - Water powers 28[illegible]
- Formulae:
  - Bazin's [illegible]
  - Chezy's 222
  - Francis' 21, 244
  - Mullin's 21
  - Orifices 22
  - Weirs 20
- Gauging streams:
  - Map showing stations, facing 365
  - Methods 15
  - Mohawk River 114
    - Slope-gaugings 198

PAGE.

Gauges:
Vertical 20
Weight 20

Genesee River:
Rochester, Monroe county.......... 97
Discharge 98
Floods 98
View of, facing.......... 98

Grasse River.......... 100
Discharge 101
Water powers 101

Housatonic River:
At Gaylordsville, Conn.:
Discharge 305
Gaugings 305
View of, facing.......... 306
Water analysis 326, 335
Water powers 305

Hudson River:
At Mechanicville, Saratoga county:
Discharge 245
Flood 244
Hydrographs 247
Run-off 247
At Fort Edward, Washington county.......... 238
Discharge 241
Floods 240
Hydrographs 242
Run-off 243
Station at 239

Hudson River, Lower:
Drainage tributary to.......... 252
Kinderhook Creek, East Nassau, Rensselaer county.......... 252
Discharge 255
Hydrograph 255
Run-off 254
Normanskill, Albany county.......... 256

Hudson River, Upper:
Drainage tributary to.......... 230
Indian River 230
Storage 233

Hudson River, Upper — (Continued): PAGE.
Ice on streams 6, 16
Hydrographs, index of 366
Illustrations, index of 367

Indices:
  Hydrographs 366
  Illustrations 367
  Streams and Stations 368
    On map, facing 365
  Volume 370
Indian River 230
  Indian Lake, dam, Hamilton county 230
    Storage 232

Industries using water power 13, 153

Introduction 5

Kinderhook Creek:
  At East Nassau, Rensselaer county 252
    Discharge 255
    Hydrographs 255
    Run-off 254

Lake Champlain outlet:
  Richelieu River 107

Lake Ontario:
  Drainage tributary to 24
    Beaver River, Tisse's Bridge, Lewis county 27
    Black River 31
      Felts Mills, Jefferson county 37
      Huntingtonville, Jefferson county 31
    Chittenango Creek 52
      Bridgeport, Madison county 52
      Chittenango, Madison county 57
    Fish Creek, west branch, McConnellsville, Oneida county, 44
    Genesee River, Rochester, Monroe county 97
    Moose River 7
      McKeever, Herkimer county 25
    Oneida Creek, Kenwood, Madison county 49
    Oneida River, Brewerton, Onondaga county 82
      Oak Orchard, Onondaga county 83
    Oswego River 7, 8
      Fulton, Oswego county 84
      High Dam, Oswego county 91
      Minetto, Oswego county 86

Lake Ontario — (Continued): PAGE.

  Salmon River, Pulaski, Oswego county.................. 39
  Seneca River, Baldwinsville, Onondaga county........... 77
    Jack's Reef, Onondaga county....................... 78
  Skaneateles Lake outlet................................ 61
    Jordan, Onondaga county........................... 67
    State Dam, Onondaga county........................ 63
    Willow Glen, Onondaga county...................... 65, 69

Map of gauging stations, facing................................ 365

Meters 18

Methods of gauging streams...................................... 15

Mohawk River:

  Drainage tributary to...................................... 114
    Cayadutta Creek, Fulton county........................ 166
    Deerfield Reservoir, Oneida county.................... 141
    Dunsbach Ferry, Saratoga county....................... 192
    East Canada Creek, Herkimer county.................... 150
      Power development 153
    Gaugings 114
      Slope 198
    Little Falls, Herkimer county......................... 158

    Oriskany Creek:

      Oriskany, Oneida county........................... 120
      Wood Road Bridge, Oneida county................... 125
    Reel's Creek, Oneida county........................... 136
    Rexford Flats, Saratoga county........................ 186
    Ridge Mills, Oneida county............................ 116
    Rocky Rift Dam, Herkimer county....................... 165

    Sauquoit Creek:

      New York Mills, Oneida county..................... 128
      Yorkville, Oneida county.......................... 129
    Schenectady, Schenectady county....................... 182

    Schoharie Creek:

      Fort Hunter Dam, Montgomery county................ 169
      Mill Point, Montgomery county..................... 175
      Prattsville, Greene county........................ 181
      Schoharie Falls, Montgomery county................ 177
    Utica, Oneida county.................................. 132

    West Canada Creek:

      Middleville, Herkimer county...................... 145
      Trenton Falls, Oneida county...................... 142
      Twin Rock Bridge, Oneida county................... 143

Mohawk River Stations: PAGE.
- Cohoes Falls, view of, facing 214
- Dunsbach Ferry, Saratoga county 194
  - Discharge 195
  - Floods 194
  - Hydrographs 196
  - Run-off 197
- Little Falls, Herkimer county 158
  - Discharge 159
  - Floods 164
  - Hydrographs 162
  - Run-off 163
- Rexford Flats, Saratoga county 186
  - Discharge 189
  - Diversions 186, 192
  - Floods 188
  - Hydrographs 190
  - Run-off 191
- Ridge Mills, Oneida county 118
  - Discharge 118
  - Hydrographs 119
  - Run-off 118
- Rocky Rift Dam, Herkimer County 165
  - Discharge 166
- Schenectady, Schenectady county 182
  - Discharge 183
  - Hydrographs 184
  - Run-off 185
- Utica, Oneida county 132
  - Discharge 133
  - Floods 134
  - Gaugings 340
  - Hydrographs 135

Mohawk River:
- Computation of slope 222
- Discharge 116
- Gaugings 114
  - Slope-gaugings 198
    - Discharge from 226
    - Formulae 222
- Slope-gauges 207
- State Dams on 114

Moose River:
- Below McKeever, Herkimer county 25
  - Gauge readings 26
  - Water powers 27

Normanskill: PAGE.
- French's Mill, Albany county 256
  - Discharge 257
  - Hydrographs 257
  - Run-off 257

Neversiuk River:
- At Port Jervis, Orange county:
  - Discharge 325

New York City, proposed sources of supply:
- Catskill Creek 258, 260
- Croton River 290
- Esopus Creek 258, 264
- Fishkill Creek 258, 284
- Housatonic River 258, 305
- Rondout Creek 258, 271
- Ten Mile River 258, 300
- Wallkill River 258, 278

Oneida Creek:
- Kenwood, Madison county 49
  - Discharge 50, 51
  - Hydrographs 51
  - Run-off 50

Oneida River:
- Brewerton, Onondaga county 82
  - Gaugings 83
- Oak Orchard, Onondaga county 83
  - Discharge 84

Oriskany Creek:
- Oriskany, Oneida county 120
  - Discharge 123
  - Hydrographs 122
  - Run-off 122
- Wood Road Bridge, Oneida county 125
  - Discharge 125
  - Gaugings 127
  - Reservoirs 126

Oswegatchie River 102
- Discharge 103
- Views of, facing 104
- Water powers 102, 105

Oswego River 7, 8
- Fulton, Oswego county 84
  - Discharge 85

Oriskany Creek — (Continued): PAGE.
High Dam, Oswego county........ 91
Discharge........ 93
Hydrographs........ 95
Run-off........ 95
View of, facing........ 90
Minetto, Oswego county........ 86
Discharge........ 86, 90
Gauge........ 89
Hydrographs........ 87
View of Cable Station, facing........ 90

Power development, Beardslee Falls:
East Creek, Herkimer county........ 153
Views of, facing........ 152

Quackenkill:
Quackenkill, Rensselaer county........ 249
Gaugings........ 250
Hydrograph........ 251
Run-off........ 250
Raquette River........ 105
Discharge........ 107
Views of, facing........ 106
Water powers........ 106

Reel's Creek:
Utica, Oneida county........ 136
Discharge........ 138
Flood........ 139
Gauging weir........ 138
Rainfall and run-off........ 140

Richelieu River:
Outlet Lake Champlain........ 107
Discharge........ 109
Hydrographs........ 110
Run-off........ 111

Rondout Creek:
At Honk Falls, Ulster county:
Discharge........ 276
At Rosendale, Ulster county:
Discharge........ 272
Diversions from........ 274
Drainage areas........ 272
Gaugings........ 273
Water analysis........ 326, 331
Water powers........ 271, 277

Saint Lawrence River: PAGE.
Drainage tributary to 100
Grasse River 100
Lake Champlain outlet 107
Massena power canal 100
Oswegatchie River 102
Raquette River 105
Richelieu River, Chambly, P. Q 108

Salmon River:
Above Pulaski, Oswego county 39
Discharge 40
Gaugings 43
Run-off 42
View of, facing 42
Water powers 40

Sauquoit Creek:
New York Mills, Oneida county 128
Run-off 128
Yorkville, Oneida county 129
Discharge 129
Hydrographs 130
Water powers 131

Sawkill Creek, Ulster county:
Discharge 268

Schoharie Creek:
Fort Hunter Dam, Montgomery county 169
Discharge 172
Hydrographs 174
Mill Point, Montgomery county 175
Discharge 177
Gaugings 175
Prattsville, Greene county 181
Discharge 181
Gaugings 182

Schoharie Falls, Montgomery county:
Discharge 178
Hydrographs 178
Run-off 180

Schroon River:
Warrensburg, Warren county 234
Discharge 236
Floods 235